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FLUOROSCOPIC BOUGINAGE OF STRICTURE OF THE ESOPHAGUS.

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In my hands fluoroscopic bouginage plays an increasingly important role in the dilatation of small strictures of the

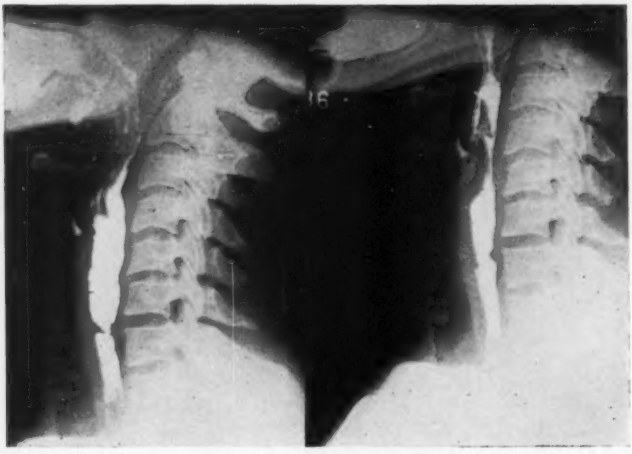

Fig. 1. Mrs. S. Anteroposterior view of esophagus with a narrow stricture at the upper end. It also shows a marked pouch. The second figure shows the effect of dilatation of the stricture under fluoroscopic bouginage.

esophagus. I have already shown one instrument which I have designed for this purpose and today I wish to show another.

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Strictures at the upper end of the esophagus are especially liable to be very narrow and above them there are often semi-pouches or sacculations which readily lead the bougie astray.

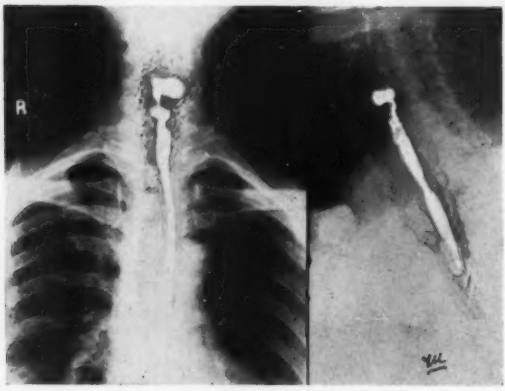

Fig. 2. Mrs. McE. Retouched X-rays showing anterior and lateral views. Plates taken before dilatation. Both plates show a very narrow constriction of the esophagus, above which there is a pouch-like dilatation.

Fig. 3. Mrs. McE. Lateral view after dilatation.

It should be understood that fluoroscopic bouginage is never attempted until the lay of the land, so to speak, is ascertained by esophagoscopy. This done, fluoroscopic bouginage saves

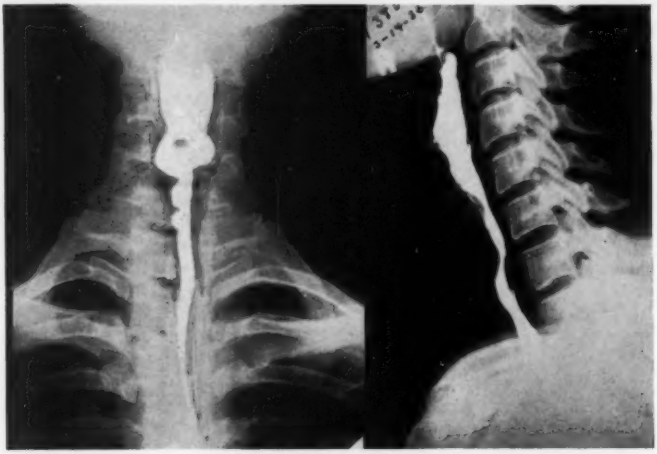

Fig. 4. Mrs. W. Anteroposterior and lateral views showing a narrow constriction in the upper end of the esophagus with a pouch-like dilatation above it.

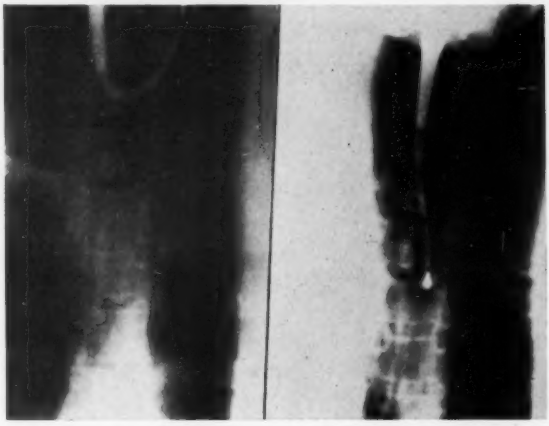

Fig. 5. Mrs. W. X-ray films showing the passage of a bougie tipped with spiral wire finder. The spiral tip did not pass the stricture and curled on itself. The bougie, therefore, had to be withdrawn and reintroduced. The second figure shows the spiral tip through the stricture and guiding the bougie in the proper line.

many subsequent esophagoscopies; it is always attended with risk. Do not misunderstand me; I am not advocating it as

a substitute for retrograde bouginage in the cases where this is indicated.

In the first case shown here, it was impossible after the esophagoscopy to pass the metal-tipped bougie, even with the aid of the fluoroscope. Accordingly, the patient was given a string to swallow. This was successful and the spiral-tipped bougie was passed on the thread. Later, the spiral-tipped bougie was passed under fluoroscopic control and, finally, sufficient dilatation was obtained so that the ordinary gum elastic bougie could be passed by touch (see Figs. 1 and 2).

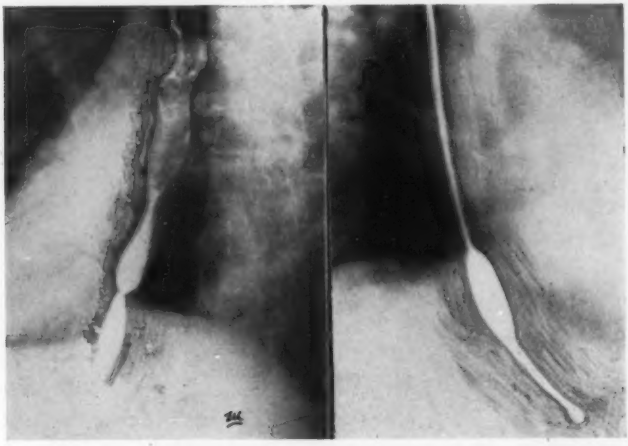

Fig. 6. This figure shows the olive-tipped bougie with the spiral wire finder being inserted under fluoroscopic vision through a narrow stricture at the lower end of the esophagus.

In the second case, for two or three years at least, I was able to pass a gum elastic bougie by touch. Then an ether dilatation became necessary. After this, I was successful only for a short time. Then bouginage by fluoroscopic sight was resorted to and is still being carried on.

In the third case, as you can see from the X-ray, the stricture is bottle-necked and well down the esophagus. For cases of this kind, I fitted a set of graduated olives with the spiral wire finder. The advantage of the finder is that you can see it pass through the stricture, and once through it guides the

olive to the right opening. Once the finder has passed the stricture, the operator is justified in attempting to push the olive through, always of course, using his best judgment as to how much force is justifiable. It is the shoulder at the entrance to the strictured narrowing which is the dangerous

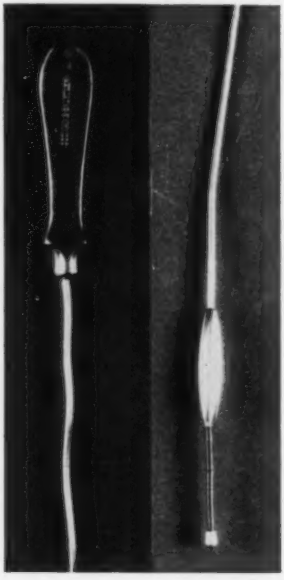

Fig. 7.

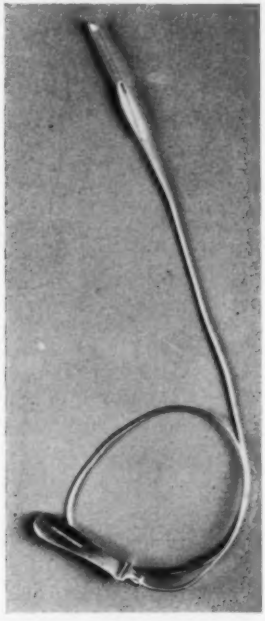

Fig. 8.

Fig. 7. Metal olive with flexible spiral wire finder for use in fluoroscopic bouginage of tight strictures. The handle of the bougie is 26 inches long, made of copper, and can be easily bent.

Fig. 8. This figure shows the handle of the bougie coiled on itself when the bougie is used for a stricture at the upper end of the esophagus. This coiling of the shaft of the bougie gives a firmer grasp to the surgeon. The olives are made in the graduated sizes, from 16 French to 30 French.

area in the passage of a gum elastic bougie because the point is liable to catch in the shoulder and make a perforation.

The carrying of a feeding tube through an esophagoscope into the stomach is often a fussy procedure. The ordinary forceps will not let go when the feeding tube has been introduced. I recently hit upon a very simple introducer.

It is an ordinary esophageal probe, at the far end of which there is a double right angle bend. The end of the feeding tube I have had closed, so that it will the better find its way through the strictured area. The end of the probe is inserted into the lower opening of the feeding tube and the shoulder in the probe carries the tube ahead of it. This is much easier to show by an illustration than it is to describe in words. A second slight bend at the shoulder of the probe allows it

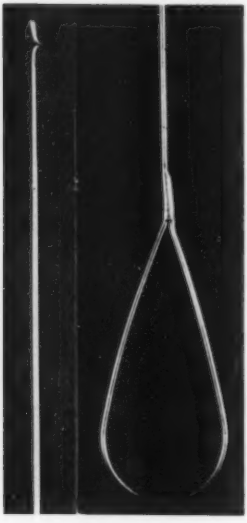

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 9. The carrier for inserting a feeding tube through the esophagoscope. The instrument is 26 inches long and projects well beyond the ordinary esophagoscope.

Fig. 10. Illustration to show the method of using the feeding tube carrier.

Fig. 11. Detail drawing to show the bend at the end of the feeding tube carrier and the method of inserting the carrier into the feeding tube.

to be withdrawn without bringing the tube with it. As the probe lies flat against the side of the feeding tube, it does not obstruct the view.

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RECURRENT LIPOMA-MYXOCHONDROMA-FIBROMA OF THE LARYNX. A CASE EXHIBITING UNIQUE FEATURES.*†

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Before discussing the details of this case, it may be well to say a few words about *lipoma laryngis* in general. This type of tumor is considered very rare. From a careful study of the literature it appears that only 32 cases have been reported during the last 42 years.

It is safe to assume, however, that these tumors are not so infrequent as the figures indicate. With the growth of medical literature there has naturally been an increase in the number of cases reported. Then, too, the use of the laryngeal mirror by general practitioners, as well as by specialists, brings to light many cases that would otherwise have gone unrecognized. Nevertheless, among all types of benign tumors of the larynx, the lipoma still remains comparatively rare.

The growth does not metastasize or infiltrate surrounding tissues, but most authors emphasize the fact that it recurs very soon after operation. We are strongly inclined to believe that this is not a real recurrence, but a continuous growth of the original tumor, which has been only partially removed.

Lipoma laryngis was first described by Holt[26] in 1854. In his case it originated in the left side of the epiglottis. The patient died by suffocation from the growth.

In 1868 a case was reported by Viktor von Bruns,[8] which has since been extensively quoted throughout the literature. The tumor was situated on the left side of the larynx. Most of it was removed by means of galvanocautery, requiring 15 separate treatments. This case resembled ours histologically in that it contained a small cartilaginous growth, probably

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*Read before the New York Academy of Medicine, Section of Otolaryngology, April 15, 1936.

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the *cartilago Santorini*, which was entirely surrounded by connective tissue.

In 1893 Schroetter[13] described a large tumor originating in the glossoepiglottic fold. Its processes, one of which was 31 mm. long, extended into the lumen of the larynx, the pyriform sinus, and the space between the posterior laryngeal and pharyngeal walls.

Histologically, the lipoma, as its name indicates, is composed of fatty cells. There are, however, variations of this simple type. Fibrous tissue is often associated with the adipose cells, thereby constituting fibrolipoma. (Throughout the literature only one case — that of von Bruns — can be discovered in which there was a combination of fatty and cartilaginous tissue such as appeared in ours.)

Due to the extreme rarity of this type, a somewhat detailed account of the case that came into our hands will be given. During the course of five years the patient underwent five separate operations.

CASE REPORT.

Operation 1: Mrs. B. P. was admitted to the New York Post-Graduate Hospital in 1930. She complained of difficulty in swallowing and breathing. An examination was made by direct laryngoscopy, and tissue was taken for biopsy. The growth was diagnosed as lipoma of the laryngopharynx and removed by endolaryngeal operation. The final diagnosis was *embryonal* tumor, lipoma in combination with fibroma and neuroma.

Two years later, in November, 1932, the patient came to New York Hospital. The history chart taken at that time, reads: "The patient is a female, age 25 years, married, Italian. Family history is negative. Three years ago the patient noticed a lump beneath the angle of her left jaw, which grew in size to about 4 cm. across. No discomfort was felt except a slight interference with breathing when lying on the *right* side. She had been operated upon * * * two years previously, but the mass soon regained its original size. The patient has lost 11 pounds in weight during the two years."

Examination showed a soft, spherical, nontender, nonfluctuant mass measuring 4 cm. in the left side of the neck

between the jaw and the sternocleidomastoid muscle. There was definite motion on swallowing. The skin was free over the tumor and not remarkable. The lungs, mouth and urine were negative. There was also a negative Wassermann.

The blood count showed red cells, 4,080,000; white cells, 6,000; hemoglobin, 85 per cent; adult polynuclears, 51 per cent; immature polynuclears, 13 per cent; lymphocytes, 25 per cent; mononuclears, 8 per cent; and eosinophiles, 2 per cent.

Operation 2: The tumor was removed by external operation on Dec. 2, 1932. To quote again from the history chart: "On reflection of the platysma and later retraction of the external jugular vein and medial retraction of the anterior jugular vein, a tumor was encountered, lying directly over the neurovascular bundle, which was invested with a split lamina of middle cervical fascia. The tumor was well encapsulated. It passed downward in the prevertebral fascia to lodge just in front of the transverse processes. Eventually, it was found to originate apparently in the cricothyroid membrane directly on the midline. Extirpation was complete and intracapsular."

The growth was diagnosed as a fibrolipoma.

Eight days later, after an uneventful recovery, the patient was discharged.

On Jan. 14, 1935, two years after this operation, the patient returned to the clinic and was referred to the O.P.D. for laryngoscopy. It was on this occasion that we saw her for the first time.

She complained of progressive hoarseness and difficulty in swallowing during the past month. There was no pain or regurgitation of food, but some obstruction of breathing when she lay on her *right* side.

Rhinoscopia anterior and posterior and transillumination of the sinuses gave negative results. The ears and oropharynx were also negative.

Laryngoscopy revealed a tumor the size of a walnut located on the left side of the entrance of the larynx. The mass was lobular and extended with one finger-like process into the pharynx. It appeared to originate on the left side of the epiglottis, in the left pharyngoepiglottic and left aryepiglottic

folds. The left vocal cord, the left arytenoid cartilage, and the pyriform sinus were covered by the overhanging growth; however, in Avelli's position the left vocal cord could be seen, and this appeared to be anatomically and functionally normal.

The mucous membrane covering the tumor was smooth and did not show any ulceration or granulation. It was pink in color except over the process, where it was yellow. At this point also it felt solid, while the rest of the mass was soft and elastic.

The growth was movable to some extent, but we could not determine by indirect examination whether or not it was pedunculated.

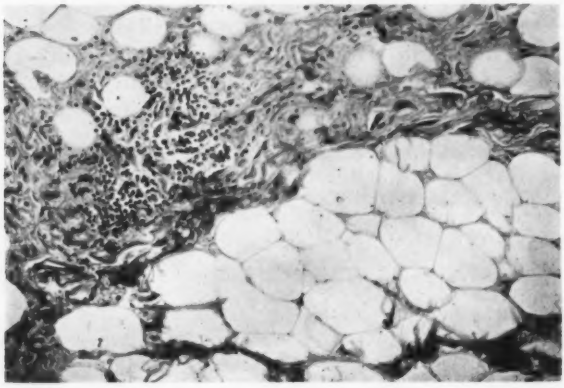

Fig. 1. A field from the first tumor removed which proved to be a fibrolipoma. This low power view shows fat and chronically inflamed connective tissue, the latter being in rather larger amounts than usual.

Based on these rather typical findings, a diagnosis of *lipoma laryngis* was easily made. The picture strongly resembled that described by Schroetter[43] in 1893, but the rather solid consistency of one part of the tumor suggested a combination of fibroma or chrondroma.

On Jan. 29 a direct laryngoscopy under local anesthesia was done to determine whether or not the tumor was pedunculated. While we were not able to ascertain this definitely, we felt from our observations that it would be possible to avoid

an external operation and remove the tumor by dissection with snare.

Operation 3: On Feb. 19, 1935, the third operation was performed under avertin and local anesthesia. The tumor mass, which was adjacent to the left lateral border of the epiglottis, the left pharyngo- and aryepiglottic folds, and extended into the left pyriform sinus, was removed. This was done through the laryngoscope without the slide, by dissection with knife, scissors, and snare. There was moderate bleeding. Electrocoagulation was applied to bleeding points (see Fig. 1). The patient remained in good condition throughout.

The histological report on the removed tumor was as follows: "Section shows a small piece of cartilage which

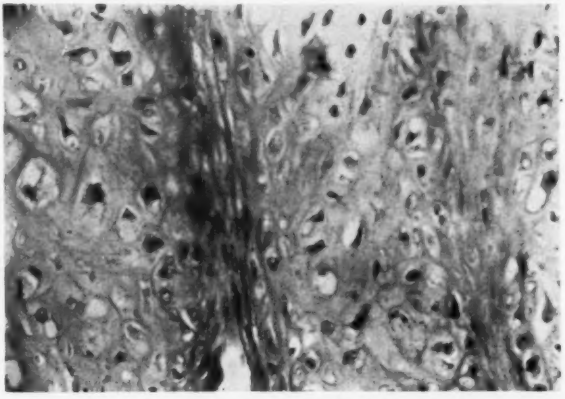

Fig. 2. Medium power field (approximately X250) from the second tumor removed. This shows fairly well differentiated cartilage and a band of connective tissue between two masses of cartilage.

shows no pathological change, and adjacent to which is a large amount of fat and fibrous tissue" (see Fig. 2).

The tumor was diagnosed as *lipoma laryngis.*

The patient was discharged in good condition on the third day after operation.

Six days later she came again to the clinic complaining of difficulty in swallowing. Examination elicited some pain at the edge of the clavicle and in the muscles of the right neck.

Granulations were seen over the surface from which the tumor had been removed. The epiglottis showed slight edema and redness on the left side. The vocal cords were visible.

The patient came regularly to the clinic, and on March 18 we found that her throat was healed. The vocal cords were visible and the pyriform sinus free. There was, however, a distinct swelling in the left pharyngoepiglottic fold. No inflammation was present and the patient experienced no difficulty in swallowing, although she said that after leaving the hospital she swallowed fluid the wrong way.

The swelling observed in the pharyngoepiglottic fold became progressively larger and on July 28, six months after the

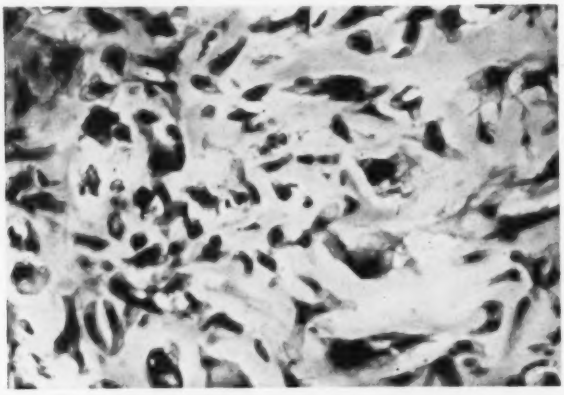

Fig. 3. (The same magnification as Fig. 2). Photomicrographic view of a less well differentiated portion of the cartilaginous tumor approaching a chondrosarcoma in its metaplastic aspects.

operation, we found a definite recurrence of the tumor, both internally and externally.

Operation 4: The external growth was removed on Nov. 16, 1935, in general surgery. Incision was made through the old scar on the left side and extended to the midline, level with the hyoid bone. The mass was well encapsulated and connected with a smaller mass by a thin neck of tough scar tissue extending towards the larynx. There was no damage to the laryngeal mucosa and the air passages were not opened.

Pathological examination of this tumor showed it to be a cystic chondroma with malignant tendencies. It measured

2x1.2x1.3 cm. There was an attached fibrolipoma, 3.5x3.5x2 cm. in size. The tumor was not radiosensitive.

The patient was discharged on the tenth day to await further operation for removal of the internal tumor, seen by indirect laryngoscopy to be situated inside the thyroid cartilage, and extending, as shown by X-ray, below the left vocal cord (see slide).

Because of the recurrence of the internal tumor following two previous operations by direct laryngoscopy, it was decided

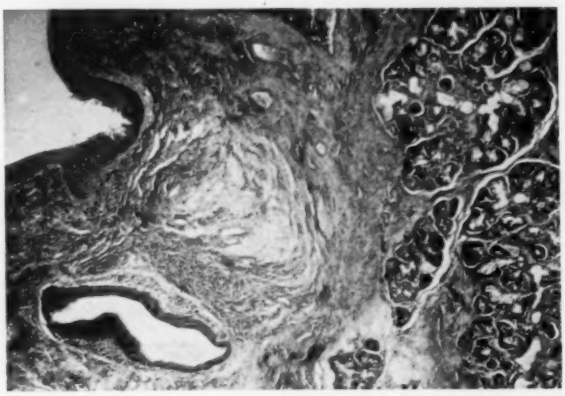

Fig. 4. Low power view from the polypoid tumor that intruded into the larynx. Note the covering epithelium and the cyst-like channel lined with the same type. There is a myxomatous nodule at the centre of the field and numerous mixed glands at the top which resemble salivary glands. This picture shows the heterogeneity of the tissue and the polyp, which would indicate something in the nature of a fetal rest, rather than a true tumor.

to perform a tracheotomy and remove the growth by laryngofissure.

The patient was readmitted to the hospital on Dec. 2. At this time her basal metabolism was —5; urine, normal; hemoglobin, 94; red blood corpuscles, 5,080,000; white corpuscles, 7,200; and polynuclears, 48 per cent.

Operation 5: Under general and local anesthesia, a midline incision was made, extending from the hyoid bone to the sternal notch. Bleeding vessels were clamped and tied off with sutures. Ten minims of 2 per cent cocain were injected

into the lumen of the trachea between the third and fourth rings and into the larynx through the crycothyroid membranes. The isthmus of the thyroid was ligated with chromic catgut, several sutures on either side, and cut in the midline. Soft tissues were retracted away from the trachea and the bleeding areas stopped. Silk sutures were inserted into the trachea in the region of the third ring on either side of the midline.

The third and fourth rings of the trachea were incised in the midline between these ligatures and the wall retracted. Elliptical excision of cartilage on either side was made for better coaptation of the tracheotomy tube. A No. 5 tracheotomy tube was then inserted and a rubber catheter placed through the tracheotomy cannula for continuation of anesthesia.

Dissection in the region of the thyroid cartilage was continued, especially to the left of the midline. The thyroid cartilage and the cricoid cartilage were split in the midline by means of saw and scissors. A 1 in. gauze pack with a knot at the end was placed in the trachea down to the tracheal cannula and extended to the lower border of the cricoid cartilage to prevent the entrance of blood into the trachea.

A growth appeared in the subglottic area about 1½ cm. in diameter, just below the left vocal cord, which was edematous and difficult to recognize. A larger mass of growth, approximately 3 cm. in diameter and lobular in shape, presented above the vocal cords in the region of the left pyriform sinus, extending upward laterally to the epiglottis. This tumor mass appeared to originate in the cricothyroid membrane on the left side. The tumor was delivered into the opening by blunt dissection and traction, and removed, together with the vocal cord, since it was not possible to spare the cord and obtain complete removal of the growth. The pathologist had advised complete excision because of the state of the tumor.

The base of the pedicle and area in the pyriform sinus was coagulated with the electric coagulator and all bleeders stopped by this method. The tracheal packing was removed. A layer suture of chromic catgut was placed over the thyroid cartilage and trachea. Interrupted end-over mattress sutures of silkworm gut were applied to the skin. Small drains were

placed below and above the tracheal cannula and gauze around the neck of the tube.

Suction of mucus from the trachea was carried out before the patient was returned to the pavilion. The mucus was slightly tinged with blood. The anesthesia throughout the operation was light, and the patient reacted favorably.

Gross examination showed the specimen to be a globular, slightly lobulated mass about 3 cm. in diameter. It was yellowish-white in color, covered by a definite capsule and of firm consistency. A polypoid mass projected from the main tumor, 1.5 cm. in length by .7 cm. in diameter, and attached by a white, fibrous pedicle 1 cm. long. On cross-section the main mass presented an ivory-colored surface with numerous vesiculi; the small, polypoid mass showed a gray surface and resembled lymphoid tissue.

Microscopic examination revealed the following: A portion of the tumor which had been removed previously (Dec. 3, 1932) gave a microscopic appearance typical of a lipoma. The portion removed on Nov. 11, 1935, showed further tissue resembling a lipoma, but in addition there was found what appeared to be a myxochondroma, which was unusually cellular and definitely suggestive of malignant degeneration.

The specimens of tissue removed at the last operation were then examined. Sections through the large, globular, lobulated mass described showed the following characteristics: The tissue was made up for the most part of a very cellular, fibrous connective tissue. This had the general appearance of a fibroma, but contained more frequent and larger nuclei than are usually seen in such a benign tumor. The tissue was not cellular as would ordinarily be encountered in a fibrosarcoma. The nuclei varied considerably in size and shape. Many were quite small, pyknotic and spindle-shaped. Others were much larger and more or less oval in shape with blunt extremities and *showed mitotic figures quite frequently.* In addition, occasional tumor giant cells were encountered, probably representing much swollen fibroblasts. Along the outer surface of the tumor, in some areas and also scattered throughout the central portion of the growth, was found a layer of stratified columnar epithelium, in most places about five to eight layers of cells in thickness. In the central portion of the tumor they resembled somewhat the crypts seen in the tonsils. The cells

composing this epithelium had somewhat hyperchromatic nuclei, but these were quite small, showing no mitotic figures, and the cells were well differentiated without any tendency to invade the surrounding fibrous tissue. The whole tumor was fairly vascular. Scattered here and there throughout the tissue were rather frequent collections of lymphoid tissue, in some instances showing typical "germinal centres." These presented no unusual characteristics except occasional large groups of migrating lymphocytes. These extended into the surrounding tumor.

Just as the previous tumor reported as myxochondroma suggested malignant change, so also in this case the cellular nature of the growth, the presence of mitotic figures, and tumor giant cells implied an early malignant change.

Microscopic examination of the two small bits of fibrous tissue described in the gross, which were taken from the inner surface of the larynx, showed the following:

The tissue was composed of a heterogeneous mixture of epithelial elements and a loose fibrous connective tissue stroma. Most of the outer surface of the tissue was covered by a thin layer of stratified epithelium similar to that described in the last specimen, except that here the tissue had a more squamous than columnar appearance. Similar tissue was seen in duct-like growth scattered throughout the whole tumor. In addition, there were large collections of mucus secreting glands. Many of the cells lining the acini were of the goblet-cell type. They all showed fairly good differentiation and did not present any malignant characteristics. In the fibrous tissue there was evidence of moderate chronic inflammatory reaction, chiefly by the presence of large areas of migrating lymphocytes. There was also some hyalinization of the connective tissue.

Sections from all the tumors removed at this date showed large numbers of blood vessels and the nervous elements were quite prominent. In this last specimen numerous plasma cells could be seen.

All these tumors removed from the larynx presented unusual characteristics. None of them showed the definite criteria of absolute malignancy. The tumors constituted distinct types of tissue growth, namely, lipoma, myxochondroma, and fibroma,

together with obscure epithelial elements, and these various types of tumor growth were found in individual, distinct groups rather than all combined in the same portion of tumor tissue.

Since such findings could not be explained on the basis of a single tumor derived from normal laryngeal epithelium, it was assumed by the pathologist that this growth occurred through branchiogenetic rest. He rendered a final diagnosis, therefore, of lipoma, myxochondroma, fibroma, with early malignant characteristics, on a basis of branchiogenetic rest.

Following this fifth operation, the patient made an uneventful recovery. For the first week the temperature range was from normal to 100.2°. The tracheotomy tube was removed at the end of 36 hours, and the patient was out of bed on the fifth day. She was not allowed to use her voice the first week. The daily fluid intake was 2500 to 3000 cc.

Four days postoperative a few moist rales were present at both bases. The chest was clear five days later. The patient was discharaged to the out-patient department on the sixteenth day after operation. Her voice was low but distinct.

About five weeks later, following an acute upper respiratory infection, an abscess developed, pointing in the midline in the region of the tracheotomy wound. This was incised and drained, and a few days later the pain and swelling in this region had disappeared. Some granulations were present in the anterior wall of the trachea, which probably represented an area of necrosis of cartilage.

On March 30, 1936, the patient's airway was adequate. There was some swelling at the left base of the epiglottis and a moderate amount of granulation tissue present in the anterior surface of the trachea. The external wounds were healed.

GENERAL CONSIDERATIONS.

Lipomata of the larynx are found in both males and females, and may occur at any age. The youngest patient recorded was age 4 years and the oldest over 80 years.

This tumor usually originates at the entrance of the larynx, where it becomes rather large. From here it may grow in three directions: Upward to the cavum oris, down towards

the esophagus, and into the opening of the larynx. If the mass forms processes, we speak of it as *lipoma arborescens.* It is generally unilateral and is attached to the epiglottis, the aryepiglottic and pharyngoepiglottic folds. There have been cases reported, however, where the mass was lying in a circle around the larynx (Holbeck).

Sometimes lipomata of the pharynx, when grown to a certain size, give rise to laryngeal symptoms. Both Kenyon[31] and Schmidt[42] describe tumors of the oropharynx reaching the larynx. In this category also belong the lipoma of the posterior wall of the hypopharynx, reported by von Eicken,[17] and that of Figi and Hunt,[19] which was hanging down the nasopharynx. The latter necessitated a tracheotomy.

In this place we would like to mention the so-called "deep-seated" subcutaneous lipomata of the neck, although they are not genuine lipomata of the larynx. These tumors develop in the space between the hyoid and thyroid cartilages and when growing towards the inside will cause laryngeal symptoms. Three such cases are quoted by Dertinger.[15] One, operated upon by Koenig, originated in the space between the larynx and hyoid bone. The second, treated by Liston, gave some difficulty in operation because of its processes, which extended to the trachea and the esophagus. The third case was observed by Taylor. It was a lipoma starting in front of the spinal column and growing around the trachea and the esophagus.

It is evident that most of the *lipomata laryngis* are extrinsic; however, intrinsic tumors have been reported, notably by Birkett[4] and Garel.[21] In Garel's case the growth originated in the ventriculus Morgagni.

Tumors of this type are usually pedunculated and, therefore, to a certain extent movable, which makes them dangerous through the possibility of suffocating the patient.

Histology: Few of the authors, in reporting their cases, give a detailed description of these tumors, but simply say that histological examination showed "lipoma." One very exact definition is found in the textbook of Seifert-Cahn.[45] Here we learn that the mucous membrane covering the tumor exhibits squamous epithelial cells with keratosis in the most superficial layers and sinking into the tissue. The arterial

changes are very interesting. There is: *1.* Thickening of the wall in all three layers, especially in the intima; *2.* dilatation of the lumen; and *3.* infiltration surrounding the vessel.

Jurasz[30] quotes Jones[29] as having found a cyst in a lipoma. With but one exception (the case of von Bruns[8]) we have been unable to find any besides our own where the microscopic examination disclosed both adipose and cartilaginous tissues in a lipoma.

Alexander,[1] who wrote a very detailed paper on chondroma, published 29 cases of so-called "mixed" tumors, but he did not mention a combination of chondroma and lipoma. The case observed by us appears to be unique, in that no other can be discovered in the literature which contains nerve elements as well as fatty, fibrous and cartilaginous tissue. We wish to emphasize this fact since it might help to solve the rather obscure question of etiology of lipomata of the larynx.

Etiology: There are a number of theories concerning the etiology of these tumors, which in itself proves that none of them is really satisfactory. While McCoy[37] believes that the lipoma originates from a fibroma through fatty degeneration, others are inclined to connect it with tuberculosis or trauma (Lieschke[34]). Von Bruns maintains (without any foundation) that in his case the lipoma was "congenital." The pathologist who examined our tumor declared positively that it was an embryonal growth. His decision was based on the complex finding of fat, cartilage, fibrous and nerve tissue.

Symptoms: The site of lipomata of the larynx is the bifurcation of the respiratory and digestive tractus. For this reason symptoms will be referred to both functions and there will be difficulty in breathing and swallowing. Pain is seldom complained of; it is just "difficut" to swallow. The respiratory symptoms are much more unpleasant and even dangerous. Since the tumors are pedunculated they move when the patient changes his position. Being generally unilateral, the mass falls over the entrance of the larynx, or even into the larynx, when the patient lies on the opposite side and causes the obstruction of breathing which may terminate in suffocation. It is this symptom that frightens the patient and brings him to the physician for relief.

Diagnosis: There is but little difficulty in diagnosing lipoma of the larynx. If the mass grows upward into the oropharynx, its upper edges can be seen by compressing the tongue.

Laryngoscopy reveals a rather typical picture. One usually sees a pedunculated movable tumor with a smooth, lobed surface. Sometimes it bears processes, which may reach a considerable length. The color of the mucous membrane covering the tumor is pink, often with areas of yellow. The mass is soft and elastic in consistency, except above those parts which contain fibrous and cartilaginous tissue, where it will be hard and solid.

Usually, it is not possible to visualize the entire inside of the larynx, but in Avelli's position the vocal cord and its movement beneath the tumor can be seen.

Soft tissue X-ray films of the larynx are very helpful. Figs. 3 and 4 show such pictures and demonstrate their value. Usually the pyriform sinus on the side of the tumor is covered by the lipoma, which explains the difficulty in swallowing.

Treatment: Most authorities recommend removal of the tumor by means of direct or indirect laryngoscopy, that is, by endolaryngeal operation. Wright[50] operated on a case by suspension laryngoscopy.

We believe that the endolaryngeal galvanocaustic method should be used only in cases where the tumor is very small. For large tumors the method is not satisfactory. Schroetter,[43] for instance, needed 15 sessions for the galvanocaustic removal of a lipoma, and our case, approached by direct laryngoscopy, was not cured and finally had to be subjected to open operation. Flynn[20] removed a lipoma laryngeally in 1925 and had to reoperate externally in 1932. It is evident that the endolaryngeal method fails to eradicate the growth in its entirety; large parts remain, which grow and cause an apparent recurrence. For this reason, in the case of large tumors, the external operation is to be preferred. If, however, the growth is embryonal, its recurrence will be difficult to prevent, even with radical surgery.

Before closing the discussion of treatment, we want to mention, as a curiosity, the method reported by Collins.[12] He claims to have cured a large fatty tumor, which hung down as a double chin to the patient's chest and from the

neck to the back, by giving the following prescription: One-half a dram of liquor potassii three times a day, gradually going up to one dram. Success was reported within a month, which may be accounted for by the fact that the patient had to take his medicine in beer and there was no danger of his neglecting the treatment!

Prognosis: In general, the prognosis for lipoma of the larynx is favorable for life, although there is the possibility, as shown, of death by suffocation (Holt,[26] Taylor) and a definite tendency to recurrence.

SUMMARY.

Based on our exhaustive study of this case, we are prepared to state that embryonal tumors composed mainly of fat may occur at the entrance of the larynx. These give the impression of plain lipomata. Since, however, various other elements have been found in their composition, a careful microscopic study of every lipoma of the larynx should be made to discover whether or not embryonal tissue is present.

On account of the fact that a lipoma of the larynx is capable of causing death by suffocation, its prompt removal is indicated.

We recommend external operation for the larger tumors.

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SCOPULARIOPSIS IN OTOMYCOSIS.*

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Scopulariopsis is a filamentous fungus bearing close affinity to *Penicillium*, but having less complicated fructifications and large heavy-walled tuberculate spores. Its members are ubiquitous saprophytes; they are found in soils, cheeses, stored meats, decaying mushrooms, larvae and cadavers of insects, etc. The biochemical property of fixing arsenic has been utilized in detecting small quantities of this element (Thom[3]).

Scopulariopsis brevicaulis hominis was first recorded as an animal parasite by Brumpt[2] in ringworm of the toenails. It has subsequently been found in cases of tinea cruris, tinea flava, a "sporotrichotic" eruption of the hands, and ulcerating granuloma (Markley, Philpott & Weidman[4]).

The authors have cultured from two otomycoses the same fungus which has been identified as the above.

CASE HISTORIES.

Case 1: J. K.†, Bohemian, born in 1898, laborer. He had suffered from rheumatism since 1928 when he was working in a coal mine. He came to the University of Nebraska Clinic for this ailment which was diagnosed as sacroiliac rheumatism. Incidentally, a bad infection of both ears was noted. He reported that this condition had started in the left ear in 1917, following a blow. His hearing had been impaired ever since, especially when he caught cold. Treatment recommended was bichloride of mercury. The patient did not report again.

Case 2: Mrs. G., American, housewife, age 30 years. The patient came to the doctor complaining of an ear infection of three years' duration. The ears did not seem particularly plugged up but were seats of severe pain. Her tonsils and adenoids were removed some time earlier and the teeth were

*This work was carried on by the aid of a grant from the Wm. S. Merrell Co., of Cincinnati, Ohio, and under the auspices of Dr. M. F. Gunderson, of the Department of Pathology and Bacteriology of the University of Nebraska, College of Medicine.

†Dr. Fred Hansen kindly furnished us with this culture.

in good condition. No treatment, as the patient did not report again.

The Organism: The colony on Sabouraud's glucose agar is at first white, an appressed growth, somewhat wrinkled, eventually becoming powdery-granular and tan, also at times with a whitish floccose growth at the periphery (see Fig. 1). On glycerine agar the white colony tends to be cerebriform and comparatively moist. On nutrient broth there is formed a heavy pellicle with a characteristic buff friable surface. Gelatin is liquefied within seven days. Litmus milk is acidified and coagulated and supports a pellicle. The fungus was planted on the following sugars: Dextrose, levulose, maltose, saccharose, lactose and galactose. The growth was strictly

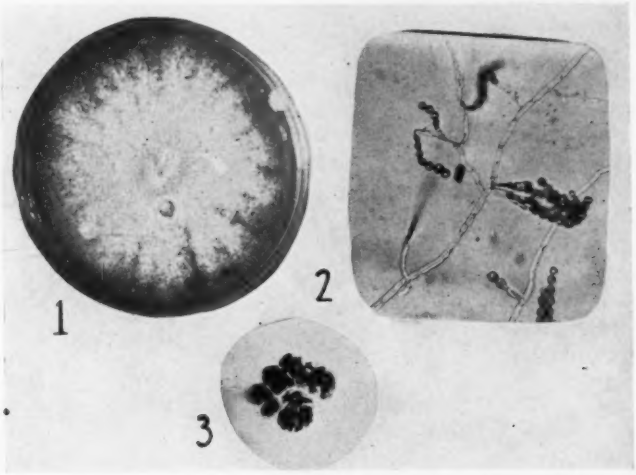

Fig. 1. Culture of scopulariopsis brevicaulis hominis upon Sabouraud's dextrose agar.

Fig. 2. Microphotograph of fructification upon glycerine agar slide culture. Mfg. 10x93.

Fig. 3. Microphotograph of perithecia. Mfg. 10x93.

superficial; no gas was produced, but acidity and eventually alkalinity on all.

The mycelium is septate, bearing solitary to several branched conidiophores which emit long chains of adherent

echinulate buff spores by an endogenous process (Pinkerton[5]) (see Fig. 2).

A culture of several months' age was cursorily examined and found to consist of semipowdery lumps of several mm. diameter. Microscopically, these were found to be clusters of perithecia, irregularly spherical bags with mediumly thick mucoid walls, the whole 30 u. in diameter. These contained small round asci 7-17 u. in diameter with usually eight immature ascospores of 3-5x5 u. proportions. This finding really relegates the organism to the ascomycetes rather than to the fungi imperfecti. Sopp[6] reported perithecia with small ostioles in *Scopulariopsis*, but Biourge[1] denied this. Markley, Philpott and Weidman[4] also reported occasional immature perithecia of 40 u. diameter.

Animal Experiments: A guinea pig was inoculated intradermally with .05 cc. of a saline suspension of the organism and likewise with 2 cc. intraperitoneally. Local ulcerating nodules soon developed but had almost completely healed within a month when the intraperitoneal injection was repeated. The lesions were more severe this time and still very obvious a month later when the animal was killed. The pathology was confined to the skin, the abnormal part extending from the surface to the peritoneal wall and containing a good deal of thick yellow pus. Smears revealed heavy-walled encapsulated conidiospores of the test organism. Cultures of the pus were positive.

To determine if the metabolic products of the fungus were toxic, a culture was grown on glycerol beef extract broth for 10 days. The fluid was then put through a Zeiss filter, the extract heated to 70° C. for one-half hour and phenol added as a preservative. Intradermal injection in a healthy guinea pig gave no reaction; however, a similar procedure in a normal person revealed evidence of toxicity in the appearance of a cm. area of erythema which persisted for several days.

We have chosen to call this organism *Scopulariopsis brevicaulis hominis* because it agrees with previous descriptions with exception of the addition of perithecia. The introduction of a new generic name would occasion unnecessary confusion at this time.

DISCUSSION AND SUMMARY.

Since our organism demonstrated mild animal pathogenicity as did those of Markley etc.,[4] it is reasonable to designate it as an etiological agent in these otomycoses.

Scopulariopsis is similar in structure and action to *Aspergillus* and *Penicillium*. They all grow superficially on the waxy layers of the outer ear passages and cause irritation largely due to obstruction, although it has been found that some metabolic products are toxic. Treatment consists in removing the plugs and in the application of fungus detergents with perseverance for long periods of time until the very resistant spores have been annihilated. Boric acid and warm potassium permanganate are recommended by Jacobson.[3]

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INTERESTING CASES OF LATERAL SINUS THROMBOSIS.*

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In presenting the following cases, I do so not because of the rarity of this complication of middle ear disease but rather because of its frequent occurrence and because of the variety of clinical signs and symptoms that may occur during its course. In the time allotted me for this presentation, I shall of necessity mention only the most salient facts in each of the cases.

Case 1: L. R., girl, age 4 years. Case No. 137005. On May 10, 1927, the tonsils and adenoids were removed. May 17 a myringotomy for bilateral O. M. P. A. was performed. She was admitted to the Manhattan Eye, Ear and Throat Hospital on May 23 and a left simple mastoidectomy performed. She ran a continued septic temperature ranging from 98 to 108°. A blood transfusion was given. Blood pictures, X-ray and signs indicated right mastoidectomy, which was performed June 1. She continued to have septic temperatures of 98 to 105°, with blood cultures negative. There were chills and atypical temperature rises. The Tobey-Ayres spinal manometer test indicated a left lateral sinus thrombosis. A pathological lateral sinus exposure was present at the time of the left mastoidectomy; there were no exposures in the right mastoid wound. On June 11 a diagnosis of lateral sinus thrombosis was made, and both lateral sinuses investigated, the left first, because of the spinal manometer reading, the sinus exposure, and the severely thickened and congested lateral sinus wall, as compared to the right. There was free bleeding from the left lateral sinus when incised and plugs were removed, first upper, then lower. There was no free bleeding from the lower end of the right lateral sinus when incised, and, therefore, the right lateral sinus was blocked and right jugular vein tied under general anesthesia. She made an uneventful recovery after being discharged from the hospital on June 29.

Case 2: G. D., girl, age 14 years. Case No. 4370. Admitted to West Side Hospital on Dec. 25, 1934, with the complaint of pain in left ear and mastoid region following O. M. P. C. since the age of 3 years. Discharge stopped three days before admission, when temperature rose to 106.6°. Mastoid tenderness was present. Signs and symptoms indicated mastoidectomy. Blood count: W. B. C. 9,200; polys., 78; hemoglobin, 60 per cent. A left mastoidectomy was performed; the descending limb of the lateral sinus was pathologically exposed. There were irregular atypical temperature rises from 98 to 106°, with one chill before a sudden rise to 106° on Jan. 4, 1935. Several blood cultures were negative. Blood Count: W. B. C., 7,400; polys., 62. In view of the clinical course and pathological findings at mastoidectomy, a diagnosis of lateral sinus thrombosis was made, and the left lateral sinus was blocked and left internal jugular vein

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tied. A transfusion was given. There was an uneventful recovery following discharge from the hospital on Jan. 27, 1935.

Case 3: S. K., boy, age 14½ years. Case No. 25713. Admitted to Gouverneur Hospital June 12, 1935, with a history of O. M. P. C. for four years. He had been acutely ill for one week before admission, with vague abdominal pains, vomiting, and painful left knee, following an acute flareup in the right ear. Blood cultures, negative. One taken June 21 showed hemolytic streptococci. Not being on service, I did not see the patient until June 22. Examination then showed, Right ear — dry canal, drum membrane, short process and handle visible. Membrane retracted, light reflex absent, dry perforation in posterior half. The margins of the perforation were cicatrized and adherent to the inner wall of the middle ear, indicating that the recent O. M. P. A. was an exacerbation of an O. M. P. C. The history, acute exacerbation of O. M. P. C., purulent involvement of left knee joint, positive blood culture and X-ray showing coalescence of cell structure, indicated exploratory mastoidectomy with inspection of lateral sinus. Left ear: O. M. P. C. residual.

Under local anesthesia, simple mastoidectomy showed a markedly involved mastoid. The lateral sinus was not bad macroscopically. Because of the mastoid pathology in conjunction with the history, examination of patient and course of the illness, the internal jugular vein on the same side was tied and the lateral sinus blocked. Following this the orthopedic surgeon incised the left knee joint which discharged many ounces of pus. An irregular temperature for the first few days, postoperatively, was followed by a temperature around 100° until July 6. From then on the temperature became septic until the patient died on Oct. 25, still draining from the leg wound. During this period the leg osteomyelitis was investigated surgically four times. At the time of demise the mastoid and neck wounds were entirely healed.

Case 4: M. C., girl, age 3 years. Admitted to Park West Hospital June 1, 1934, with a history of pain in the left ear for three weeks, persisting after myringotomy for O. M. P. A. The temperature on admission was 105.6°. All typical signs of acute mastoiditis warranted simple mastoidectomy, which was performed immediately. There was no exposure of the dura or lateral sinus. Temperatures from June 1 to June 5 ranged from 102.5 to 105°. Blood cultures were negative. On June 3, red spots appeared over both olecranon processes of both elbows, increasing in size. The next day 29,000 units of State Health Department antistreptococcus serum was given, with no improvement. Blood culture showed hemolytic streptococcus. On June 5, because of the clinical picture, presence of metastatic areas, and positive blood culture, tying of the left internal jugular vein and blocking of the left lateral sinus was performed. A blood transfusion was given after this. Incision of an abscess over the left elbow joint yielded pus. The infected area over the right elbow resolved spontaneously. She was discharged from the hospital on June 19. An uneventful recovery occurred.

Case 5: F. D., male, age 68 years. Admitted to Polyclinic Hospital on Aug. 22, 1934. Two and one-half months previously he had had a right myringotomy for pain. The pain recurred three weeks before admission. On admission every classical sign and symptom of acute mastoiditis was present except increased temperature. The diagnosis was corroborated by X-ray. Under local anesthesia, a simple mastoidectomy showed mastoid cells entirely broken down with a large pathological exposure of the lateral sinus covered with granulations. Postoperative temperature dropped to normal within 48 hours and remained below 99° until Sept. 2. Daily dressings at no time showed the wound to be clearing itself of the purulent process. The lateral sinus wall still appeared dirty gray, as was the rest of the wound. Just prior to the dressing on Sept. 2, the patient had a severe chill and sudden rise in temperature from 99 to

104° within one and one-half hours. At this time, examination of the wound disclosed an interesting finding. At the lowermost portion of the descending limb of the lateral sinus a hole was visible in the lateral sinus wall, patent and without any bleeding. Lateral sinus thrombosis with spontaneous pathological perforation had occurred. Further verification of the diagnosis by laboratory methods was not needed. An internist declared the patient able to withstand surgical intervention. Under local anesthesia the internal jugular vein on the affected side was ligated and the lateral sinus blocked. A transfusion of 500 cc. was given. An interesting complication during the first 12 hours following this operation was the sudden onset of intermittent twitchings of the left arm and leg; soon these became much more marked and went on to clonic convulsions involving the entire body with complete loss of consciousness, all this occurring within one hour of the onset of twitchings. Dr. Locke, an alert and intelligent house surgeon, recognized the situation. In view of the fact that I was out of town at the hour, he received instructions over the telephone from me to loosen the iodoform plugs which blocked off the lateral sinus above and below, which unquestionably were inserted too snugly. This was immediately done and within the next hour all convulsions had ceased and the patient had regained complete consciousness. An uneventful recovery ensued and he was discharged from the hospital on Sept. 21.

Case 6: H. S., male, age 11 years. Admitted to Polyclinic Hospital April 6, 1935, at 10:30 P. M. with chief complaint chills and vomiting. He had recently had German measles. One week before he had developed right earache, for which a myringotomy was performed. The discharge stopped, followed by severe 15 minute chills, vomiting and fever. The temperature on admission was 103.5°. From the history, clinical course and findings in and behind the ear, a diagnosis of acute mastoiditis, perisinus abscess and possible sinus thrombosis was made.

Under local anesthesia a simple mastoidectomy showed a severe broken down mastoid process with perisinus abscess at the knee of the lateral sinus, extending over the horizontal limb of the lateral sinus. Normal sinus was exposed beyond the granulations. The soft middle fossa plate was removed. Next day, postoperative, the temperature was 106° and at 4 P. M. on the same day it was 98°. Between 6 and 8 P. M. a severe chill occurred with a sudden temperature rise to 105°. Culture from the mastoid wound showed hemolytic streptococcus. Taking into consideration the pathological exposure at and posterior to the knee of the lateral sinus, and the previous history of chill and sudden rise in temperature, I did not wait for further corroboration of involvement of the blood stream, but immediately performed the second operation under local anesthesia.

Diagnosis: Lateral sinus thrombosis. All the sinus plate covering the entire descending limb of the lateral sinus was removed, exposing normal sinus wall. Because the lesion was high up at the knee and posterior to the knee, it was decided not to ligate the internal jugular vein, but just to block off the lateral sinus low down in the region of normal lateral sinus wall and high up at the horizontal portion; posterior to the pathological lesion at the knee. When blocked, the lateral sinus was incised and drained. The wound was left widely open for drainage. A transfusion of 400 cc. was given. Blood culture two days after blocking of lateral sinus showed rare colony of hemolytic streptococcus. An uneventful recovery occurred after this procedure and following discharge from the hospital 14 days later, on April 21.

Case 7: H. F., male, age 24 years. First examined by me on admission to hospital Aug. 24, 1935. History of O. M. P. C. for 12 years, with acute exacerbation and increased discharge for 10 days prior to admission. There had been pain and tenderness over right mastoid, and marked vertigo. The day previous to admission the vertigo stopped. The tem-

perature rose to 104° following severe chills twice on the day of admission, and dropped to 100° after each of these sudden rises. In addition to signs of acute mastoiditis, a mass of granulations was seen filling the entire middle ear. There was another chill and the temperature rose to 105° the next morning. Because of the urgency of the condition and lack of time, no laboratory examinations were done. Diagnosis: Acute lateral sinus thrombosis, complicating chronic mastoiditis.

Under local anesthesia an immediate radical mastoidectomy was performed. The lateral sinus was so far forward that the posterior bony canal wall could actually be considered the bony plate of the lateral sinus, which was pathologically exposed; granulations and pus were present in the region of the mastoid antrum. The lateral sinus was blocked above and below and incised and drained. The internal jugular was tied on the same side. Only when the ligature was passed under the vein was a little gas oxygen anesthesia given. A transfusion was given postoperatively. Slowly the septic temperature became normal. Nineteen days after operation, on Sept. 13, 1935, the patient was discharged from the hospital with the mastoid wound granulating and the meatal wound healing nicely. At the insistence of the patient and the oto-laryngologist who referred him, I allowed the doctor to continue the postoperative treatment. This was done for four weeks, during which period I saw the patient twice, and each time the condition was progressing nicely.

About one week prior to readmission to Polyclinic Hospital, on Oct. 12, 1935, the doctor felt the wound was granulating slowly and placed a suture through the mastoid wound to bring the edges together. From then, headache recurred until the night before readmission, when a facial paresis occurred. This indicated some pressure in the course of the facial nerve in the middle ear or internal to it, as no other exposure of it was made. Because of the toxic condition of the patient, the presence of facial paresis, and the headache, exploration of the wound was performed.

Under gas oxygen anesthesia gentle separation of the former mastoidectomy wound was performed. Very extensive bleeding occurred from the massive granulations throughout. Because of this bleeding, nothing further was done. Iodoform gauze drainage was used. For 48 hours postoperatively the patient was quite comfortable. Temperature was 101°. On the third day he became irrational and very suddenly died after his temperature rose to 104°. Spinal fluid was taken the day of demise. Cell content was 10,168 per cm.; globulin, 4+; culture, no growth in six days. Cause of death as reported, meningitis (as disclosed by above spinal fluid report). No autopsy was obtained. The reason for the very sudden death of the patient could not be explained.

CONCLUSIONS.

A great amount of data can be assembled from the study of this series of interesting cases, each of which revealed some details not referred to in the typical textbook presentation of this serious intracranial complication.

1. We find it is not essential to have had exposed lateral sinus, either pathological or accidental, to have lateral sinus thrombosis present.

2. Typical "sawtoothed" septic temperatures may or may not be present, preceded or not by chills.

3. The complication may arise early in the course of an acute middle ear infection, though it occurs most frequently during the course of an O. M. P. C.

4. Lateral sinus thrombosis may occur at any age from childhood to old age.

5. In certain cases, no evidence of chronic mastoid disease may be elicited subjectively until the acute clinical picture appears, indicating the presence of acute lateral sinus thrombosis. This most frequently occurs during the course of an O. M. P. C.

6. In certain cases no evidence of the complication may be present subjectively or objectively, until perforation of the lateral sinus occurs during the lateral sinus thrombosis.

7. Eye fundus changes may or may not be present.

8. Metastatic foci may occur early or late in the course of the complication, or not at all.

9. Operations may be done under local anesthesia.

10. Occlusion of the lateral sinus *without* ligation of the internal jugular vein will give successful results, when the pathology in the lateral sinus is high, and blocking can be performed in the normal region of the lateral sinus, below the site of pathology.

11. To depend upon positive laboratory findings before proceeding surgically in many cases will delay the proper treatment unduly.

12. Laboratory results at times may even mislead and delay.

13. Toby-Ayres cerebrospinal fluid pressure test is not foolproof.

14. When indicated, investigation of both lateral sinuses may be done with safety to determine which is thrombosed.

15. The wounds after blocking of the sinus should not be sutured, but allowed to granulate in.

16. In an effort to prevent further inward involvement into the lateral sinus where perisinus abscess is present at the time of the mastoidectomy, the normal sinus should be exposed surrounding the pathological area involving the lateral sinus.

17. The patient should be left in the care of a thoroughly trained assistant or nurse, who should be able to recognize and report or even treat untoward symptoms.

18. Application of keen diagnostic acumen and judicious surgical judgment, with early operation for sinus thrombosis, will unquestionably give the patient a better opportunity for complete and uneventful recovery.

19. To prevent intracranial complications, lateral sinus thrombosis or others, O. M. P. C. should be avoided by properly treating O. M. P. A. Every O. M. P. A. should be followed until a dry middle ear exists, whether treatment be conservative or surgical.

522 West End Avenue.

HEMOLYTIC STREPTOCOCCIC MENINGITIS WITH RECOVERY.

DR. GEORGE H. POIRIER and DR. BURTON E. LOVESEY, Boston.

This case is reported because of the relative scarcity of proven cases of streptococcic meningitis in which full recovery occurred. There are about 15 reports in the literature in the last 20 years which concern a total of 94 cases, in 53 of which streptococci were cultured.

A graduate nurse's child, male, age 4½ years, was admitted to the Massachusetts Eye and Ear Infirmary, Boston, Mass., on Dec. 2, 1935, and discharged on Feb. 17, 1936, making his total number of days in the hospital 77.

The patient had a normal delivery, was breast fed, a tonsillectomy at the age of 2½ years and was in good health until one week before entrance to the infirmary. At that time he developed a head cold. The following day there was an elevation of temperature, 103.6°, cough and nasal discharge. Three days later there was a spontaneous rupture of the right tympanic membrane and some headache. The discharge was profuse and thick and the fever continued. Upon being transported to the hospital, the mother noticed the left ear was discharging.

On entrance the child was in a semicomatose state and with marked rigidity of the neck. Temperature, 103.6°; pulse, 140; and respirations, 40. Both ears revealed a thick purulent discharge from anterior inferior perforations. There was a thick mucoid discharge in the nose, and both nares were excoriated. The tonsils had been cleanly removed, the pharynx was congested. Puerile breath sounds were present in the upper part of the chest, but no dullness or bronchial breathing. Abdominal reflexes were absent, and a bilateral Kernig was present.

X-rays of the chest were negative, and X-rays of both mastoids showed density but no destruction of the mastoid cells.

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Lumbar puncture revealed 910 cells with 63 per cent polymorphonuclears; 5 cc. of a ground glass-colored spinal fluid was removed, showing an initial pressure of 200 mg. The smear was negative for organisms, but the culture was positive for hemolytic streptococcus in 24 hours.

During the following eight weeks the rigidity of the neck persisted, and 20 lumbar punctures were done. The cell count ranged from 600 to 3,000. The presence of hemolytic streptococci was positive 12 times (see Table 1).

The temperature on admission was 103.6° and ran a variated course from 97.8 to 105.2° for a period of 25 days.

	1935																				1936
DATE	12-5	12-6	12-7	12-8	12-9	12-10	12-13	12-14	12-15	12-16	12-17	12-18	12-19	12-20	12-21	12-22	12-28	12-29	1-4
INITIAL PRESSURE	200	200	230	200	170	220	430	250	320	150	300	200	220	250	160	100	180	120	50
JUGULAR COMPRESSION	L 230 R 200	L 300 R 250						L 300 R 250						L 700 R 700			L 950 R 960		
COMPRESSION RELEASED								L 330 R 330						L 900 R 1200			L 780 R 190		
FINAL PRESSURE	200					220		100	150	100	150	70	110	110	85	90	60		20
C.C. FLUID REMOVED	5	4	2	10	7	5	20	6		10		10	8	10	14	8	10	5	3
APPEARANCE: CLEAR			CLOUDY				CLOUDY											SLIGHTLY CLOUDY	SLIGHTLY CLOUDY
APPEARANCE: COLOR	PEARLY GLASS	GR. GLASS		GR. GLASS	GR. GLASS	GR. GLASS		GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	GR. GLASS	
APPEARANCE: CLOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE BLOOD CELLS PER C.MM.	910	1370	3440	2140	1860	2660	2030	2011		1764	3080	950	1320	1900	1040	1815	2120	980	
% POLYMORPHONUCLEARS	63	68	78	72	88	59	86	89		79	92	83	86	86	87	84	79	70	
TOTAL PROTEIN	INSUFFICIENT QUANTITY			66			91	129	95		118	116	124	118	114		160		
SUGAR	34			29			36	29	36		39	28	34	33	25		21		
CHLORIDE				642			666	INSUFFICIENT QUANTITY	666		636	660	665	636	639		590		
HEMOLYTIC STREPTOCOCCUS	+	+		+	+	+	+	+	+	+		+		+	+				

TABLE I — SPINAL FLUID FINDINGS

It then remained in the vicinity of 99 to 100° for seven days. The next 20 days showed a picket-fence type, ranging from 99 to 105.2°. For the remainder of his sojourn in the infirmary the temperature was normal. The pulse ranged from 80 to 160 throughout the course. The respirations on entrance were 40 but soon averaged 26. Urine examinations frequently done were essentially negative.

Fourteen examinations of the blood revealed a range of white blood cells from 10,000 to 36,000. On Jan. 18, 1936, the red blood cells dropped to 2,870,000. A transfusion of 200 cc. of citrated blood was given to the patient, the father

being the donor. Six blood cultures were taken, and the presence of hemolytic streptococci found in four (see Table 2).

Consultations by the Ophthalmological Service revealed the eye grounds normal in appearance on admission. One week later there was engorgement and tortuosity of the veins present, and the margins of the discs were blurred but no measurable choking found. At the end of two weeks 2 diopters of choking were present. From then on the amount of choking gradually diminished until at the time of discharge from the infirmary the eye grounds were normal; at no time were any hemorrhages or exudate noted.

X-rays were taken serially and on admission showed marked increased density of both mastoids but no cell destruction. Nine days later there was some decalcification on the right

	1935								1936					
DATE	12-5	12-7	12-9	12-10	12-14	12-20	12-28	12-30	1-6	1-9	1-11	1-13	1-18	1-22
HEMOGLOBIN	85	80	80	75	80	80	85	90	85	75	80	80	80	85
W.B.C.	36,600	34,400	22,500	29,600	25,600	23,450	35,000	18,200	16,000	15,600	13,200	14,600	19,600	13,200
POLYMORPHONUCLEAR	85	85	84	86	89	89	89	83	80	82	77	82	71	84
LARGE LYMPHOCYTES	15	15	16	14	11	11	11	17	20	18	23	18	29	16
R.B.C.	3.75			3.6				4.55	3.66				2.87	3.66
HEMOLYTIC STREPTOCOCCI IN BLOOD CULTURES		Positive	Positive	none found	Positive			none found					Positive	

TABLE II-BLOOD EXAMINATIONS

side. Seventeen days later the left mastoid was definitely clearing until the last three series showed that both mastoids were definitely normal.

The Neurological Service in consultations commented as follows: "The patient when first visited by the Neurological Resident was stuporous, having had paraldehyde. The pupils were fixed and dilated from homatropine. Both eyes were turned to the right; the discs were normal. The abdominal reflexes were not obtained. There was no cremasteric reflex on the left. Both plantar reflexes were equivocal. There was stiffness of the neck and bilateral Kernig, also a right-sided Brudzinski.

"The impression at that time was that this was a case of extradural infection on the left side and, from the fact that the spinal fluid sugar content was low, a diagnosis of early

meningitis was also made. The Neurological Service advised surgery.

"The patient was seen four days later by the Visiting Neurologist, Dr. James B. Ayer, who found evidence of a meningeal infection, with no definite localizing signs, and felt that surgery should be done.

"Twelve days after admission the patient was visited by the Neurological Resident who found him alert and co-operative with no evidence of weakness in any extremity. The visual fields were normal. The reflexes were equal in both the arms and legs. The abdominal and cremasteric reflexes were both present and equal. Both plantar reflexes were normal. There was a slight amount of stiffness of the neck and a moderate bilateral Kernig present. It was recommended that we continue the lumbar punctures and do a cisternal puncture for two reasons: First, for the release of any pressure if present; second, to determine the present bacteriology."

The Neurological Service in summarizing this case stated that when first seen the diagnosis of an extradural abscess with a possible extension to the subarachnoid space, more probably on the left side, was made. When seen later, no localized signs could be found and meningitis, probably basilar in type, was all that could be definitely diagnosed.

"When last seen the patient had improved sufficiently so that the meningitis was apparently taking care of itself, and no surgery would be indicated."

Dr. Harold Higgins, of the Pediatric Service, gave us the following comments on the case: "Our impression of this child was a bilateral otitis media acute suppurative, probably hemolytic streptococcic with extension of the process through the bone to the meninges and sympathetic meningitis. There might be a left lateral sinus thrombosis. It seems to me at this time a mastoid operation with removal of the diseased bone and drainage of a localized abscess would be in order.

"About Dec. 7 the early reports from the Bacteriology Laboratory concerning the spinal fluid seemed to indicate a diplococcus, which might be a pneumococcus present. I do not believe the patient had a pneumococcic meningitis, because

the course had been slow, whereas pneumococcic meningitis is usually a very rapid, progressive and fatal disease, and believe no pneumonia was present at all. I still am inclined to believe that this child had an infection with an abscess, either extradurally or in the brain tissue very adjacent to the meninges.

"My recommendation at the present time would be to explore as for a mastoidectomy; however, I am quite willing to adhere to Dr. Poirier's decision to do no operating now because of the inability to localize the pathology.

"In conclusion, I feel that this case is a good demonstration of the fact that radical treatment is not always best. The result of the infection as seen on discharge from the infirmary certainly was very gratifying. I do feel, however, that we must be prepared for a possible flare-up of the infection from what would be a walled off abscess."

SUMMARY.

In reporting this case we do not wish to create the impression that mastoid surgery is contraindicated in meningitis of otitic origin. We realize that infection may invade through the nasal passages and blood stream, and the meningitis may not be associated with the ear condition present but only an incident. The line of demarcation is difficult and delicate between operative and nonoperative cases and is very hard to define. Each case requires considerable experience and demands not only a clear definite history, but to be backed up with skillful, intelligent clinical findings. During the months we are at the infirmary, cases of discharging ears with meningitis are divided into three groups for the purpose of treatment.

The first group comprises cases of meningitis associated with acute disease of the ear of several weeks' duration in which there is clinical and Roentgenographic evidence of suppurative mastoiditis. In these cases we do a simple mastoidectomy, bare the dura and expose the lateral sinus.

In the second group, comprising cases of meningitis with chronic suppuration of the ear, with or without acute exacerbation or cholesteatoma, we do a radical mastoidectomy and

make careful search for an extradural abscess or a lead to an abscess of the brain.

The third group, comprising cases of acute fulminating upper respiratory infections with profuse nasal discharge and suppurating ears, of short duration, and meningitis accompanied with no clinical or Roentgenographic evidence of destruction in the mastoids, we give symptomatic treatment, general pediatric treatment; lumbar punctures, when signs of intracranial pressure are present; and transfusions when indicated by the blood picture.

Since discharge from the infirmary three months ago, this patient has been perfectly well. On careful examination and check-up at this time we were unable to find any physical or mental defect.

243 Charles Street.

AN EAR DRUMHEAD MODEL.*

DR. GERVAIS WARD MCAULIFFE, New York.

The idea for this model was obtained from an exhibit of Dr. James Mendel at the 1935 American Medical Association Convention held at Atlantic City, N. J. This exhibit received the blue ribbon award.

The building and execution of this model and its application to teaching are entirely new; its reception by the students has been stimulating to such a degree that we believe a definite place has been found for the model in teaching.

We were confronted with many problems in the quest for an independent culmination of the idea. Our funds would only permit an expenditure of approximately $100. We desired a mobile unit which could be moved from the lecture hall to different seminars with facility. The size must be such as to permit accurate reproduction on a large scale. The clear perception of the different drumhead models by a class of students being directly proportional to the size.

Our attention was first directed to the construction of a large oblong box mounted on easily rolling casters. The dimensions were 6½ ft. in height, 5 ft. long and 2 ft., 4 in. in depth. It was so constructed that the front end had a large circular opening for the reception of the reproduction of the canal and otoscope. The back was left open, only a roof, floor and three walls being built. On the inside some 10 shelves were built at either end for the reception of the ear drumhead models. On the outside at either end were placed two handles to facilitate its handling in transportation. This structure was built entirely of white pine and stained mahogany. The end-result is shown in the accompanying photographs.

If we were by a reproduction of component parts to give the illusion of looking through an otoscope into the external auditory canal at the drumhead we had to rely on accurate simulation of the normal. This proved to be a simple problem

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by utilizing heavy galvanized sheet tin. This consisted of two distinct parts: an outer rim to resemble the otoscope, joined to an inner tubular portion simulating the external auditory canal. The outer portion was painted a dull black. The inner portion was painted a flesh color to simulate the skin of the canal.

These two portions of the unit could now be placed in the circular opening of our box and tilted to any desired angle. This adjustment was necessary because of the slope of the lecture pits. Once the desired angle was reached the artificial

Fig. 1. Front view.

canal could be fixed in place by hooking it to the roof of our box by means of a chain.

Reproduction of the drumhead proved to be a problem of no mean proportion. Accurate reproduction from life was the first essential. The average drumhead is roughly ovoid in shape. The color is pearly-gray and has a peculiar shining luster. It might be compared to the inner surface of the

shell of a freshly opened oyster. The perpendicular diameter is about 10 mm., its horizontal diameter about 8.5 mm. The drumhead is not a flat surface but has a central concavity greatest in its central portion, the umbo. The normal drumhead, anatomically, is so placed that it lies in two distinct planes. There is first a distinct lateral incline which renders the upper portion nearer the external auditory meatus than the lower portion. Secondly, the posterior portion slopes laterally, also rendering the anterior portion deeper in its

Fig. 2. Rear view.

relation to the external canal. The normal drumhead exhibits consistently five landmarks, namely, the posterior fold, the anterior fold, the short process of the handle of the hammer, the handle of the hammer itself and, finally, the cone of light.

To recapitulate, we had to deal with the following: *1.* central concavity (umbo); *2.* the slopes of the drumhead; *3.* the five landmarks; *4.* the minute size ($\frac{3}{8}$ in. in height).

These factors had to be dealt with in such a manner that an exact and accurate reproduction of the normal drumhead would be the result.

It was thought from the beginning that a reproduction of 30 times that of the normal drumhead size would be sufficient for our purpose. This was the scale that was followed. Experiments were first made with cardboard to simulate the size and concavity of the drumhead. Our final models were made of galvanized square sheets of tin. These were cut to

Fig. 3. Side view of canal and otoscope.

conform to the oval shape of the drumhead. A wedge-shaped piece was removed, the base at the periphery, the apex centrally, and the ends brought together and soldered. This procedure gave us the umbo and the general contour of the drumhead.

The landmarks were then placed in by using modelling clay on the hopper-shaped tin drumhead. When the clay land-

marks were finished, gauze and shellac were used to insure their retention on the tin base.

The simulation of the color of a normal drumhead was by far our most difficult undertaking. A base coat of flat white was first applied and different shades of gray were then tried until we reached a fairly satisfactory hue. The color of the normal drumhead has a somewhat warmer tone than pearly

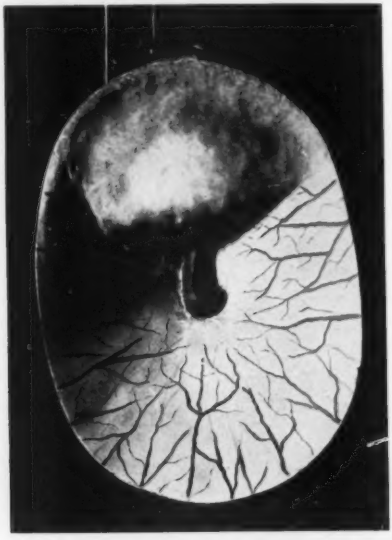

Fig. 4. Front view of model of drumhead. "Bulging of the membrana flaccida."

gray. A final coat of clear varnish was then applied as a fixation coat.

Experiments were then tried with different attachments to give easy placement of the model at the receiving end of the canal. The accompanying photographs illustrate the tongue and slot arrangement. This promotes a rapid interchange of models and is essentially simple in operation.

The illumination of the reproduced drumhead was accomplished by using the spotlight in the main lecture halls. In the seminars a detachable flash bulb was used.

We have made 18 models in all to simulate as closely as possible different disease entities of the middle ear as reflected by the drumhead. We contemplate graphic illustration of interesting cases and permanent record of unusual drumhead conditions.

In conclusion, we hope the model will prove as helpful to others in the teaching of a difficult phase of otology — the drumhead in diseases of the middle ear.

110 West 55th Street.

SECOND ANNUAL MEETING MISSISSIPPI VALLEY MEDICAL SOCIETY.

The Second Annual Meeting of the Mississippi Valley Medical Society will be held at Burlington, Iowa, Sept. 30, Oct. 1-2. The entire meeting, including the technical and scientific exhibits, will be held on the mezzanine floor of the modern, 300-room Hotel Burlington. There will be morning, afternoon and evening sessions and the complete program has been especially arranged to appeal to the general practitioner. There will be over 60 lectures, demonstrations, etc., for the full three-day session. All ethical physicians are cordially invited to attend. A detailed program may be obtained from Dr. Harold Swanberg, Secretary-Treasurer, 211-224 W. C. U. building, Quincy, Ill.

THE INCIDENCE OF SINUSITIS AND NASAL POLYPI IN BRONCHIAL ASTHMA.*†

DR. SAMUEL F. KELLEY, New York.

The more general interest manifested by the medical profession, at this time in allergic conditions, particularly those involving the upper respiratory membranes, makes it essential for the oto-laryngologist to become familar with the common rhinological findings and the necessary steps to be taken in establishing a diagnosis in such cases. One of the most common allergic diseases with which the oto-laryngologist is confronted is bronchial asthma. Since the causative agents of this disease may be an inhalant or ingested allergens or bacterial infection or a combination of allergens and infection, it becomes an important problem to discover the exciting factors. The oto-laryngologist will find it advantageous to obtain the cooperation and skilled services of the allergist, radiologist, bacteriologist and pathologist.

It is proposed in this instance to state briefly some of the more common rhinological findings recorded in a study of 100 cases of bronchial asthma referred from the Department of Allergy to the Department of Otolaryngology of the New York Hospital, for investigation of the upper respiratory tract. This group is comprised of 46 males and 54 females. The age range is from 4 to 69 years, and the duration of time since the onset of asthma varies from two months to 33 years. The cases reported were nonselected, each case having had a complete history, general physical examination, numerous sensitivity tests and other tests made by the allergist who established a diagnosis of bronchial asthma.

A careful examination of the upper respiratory tract was made in each case and all observations recorded. In addition to the usual routine procedures employed on examination, the

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routine use of the nasopharyngoscope and Roentgenograms of the nasal accessory sinuses were made without exception. X-rays of the sinuses were repeated one or more times at varying intervals on several patients, upon whom operation was anticipated in order to determine if shadow casts were a transitory allergic reaction of the sinus membranes or represented a permanent hyperplasia. A special study and report on all sinus X-ray plates was made by Dr. Carty and Dr. Schwartz. Antral lavage was done in most cases and cultures made from the washings. Smears from the nasal membranes were taken for eosinophilic count, in many instances for further evidence of its allergic nature. In all operative cases cultures were taken from the surface of the sinus membranes and from all sinus tissues removed and reported by the bacteriologist. In addition to this, a tissue study with staining for bacteria was made by the pathologist.

Since this brief report is concerned primarily with the rhinological clinical observations, the sensitivity reactions, bacteriological and pathological findings are subject matter for the allergist, bacteriologist and pathologist, respectively.

In our study comprised of 100 cases of bronchial asthma, based on the X-ray reports, 89 per cent were found to have a hyperplastic sinus membrane involving one or more of the nasal accessory sinuses. In relative frequency of involvement of one or both of the paired sinuses, the antra ranked first, there being 82 cases; the ethmoids second with 69; the sphenoids third, 66; and the frontals fourth, 46. Bilateral involvement of the antra was recorded in 73 cases, bilateral involvement of the antra and ethmoids in 38 cases, and bilateral involvement of all sinuses in 13 cases. Only 11 cases, or 11 per cent, revealed no pathology of the sinuses. These statistics suggest a rather pronounced susceptibility of the sinus membranes to a hyperplastic change. Of this group of cases having a chronic hyperplastic sinusitis it was interesting to observe the relative frequency of a superimposed allergic reaction upon the hyperplastic nasal membranes and the presence of nasal polypi.

For the purpose of demonstration the following Table No. 1 is presented, which shows the number of cases with hyperplastic sinus membranes and the number of these with allergic nasal membranes and nasal polypi in ages by decades:

TABLE 1.

CASES WITH HYPERPLASTIC SINUSITIS.

Age	No. Cases	Allergic Membranes	Nasal Polypi
4-10	11	7	1
11-20	7	6	1
21-30	18	13	6
31-40	15	10	5
41-50	24	16	6
51-60	9	5	3
61-70	5	3	1
Total	89	60	23

This table shows by ages in decades the number of cases with hyperplastic sinusitis, together with the number of these cases having allergic nasal membranes and nasal polypi.

The pale, edematous nasal mucous membrane with a rather profuse watery of mucoid discharge has been termed an allergic reaction. It is observed that 60 of the cases with hyperplastic sinus membranes presented an allergic reaction of the nasal membranes, while 23 were found to have nasal polypi of the mucous type. Grayish allergic reactions of the dependent portions or the medial or lateral aspects of the turbinates have not been considered as nasal polypi. The nasopharyngoscope was useful is discovering small polypi which otherwise would have been unobserved. Fifty-seven cases, or about two-thirds of all those with chronic hyperplastic sinus membranes, were found within the decades between the twenty-first and fiftieth year, the peak being reached between the forty-first and fiftieth year. There is likewise an increase in the number of cases presenting allergic nasal membranes and with nasal polypi within these same three decades. In view of the presence of bacteria in the sinus membranes removed at operation, and the tendency of these patients to have periodic attacks of bronchial asthma with acute inflammatory upper respiratory membranes, especially during the fall, winter and spring months, infection has been considered an important excitant in this group of cases with hyperplastic sinus membranes. Infection, however, has not been considered the sole excitant since a large majority of this group showed sensitivity reactions to one or more inhalant or ingested aller-

gens and are, therefore, regarded as a mixed infection and skin-sensitive type.

The majority of these asthmatic patients were examined during a mild asthmatic attack or in the brief interval between attacks. A few cases were seen while in a severe attack and three were seen while in a semicomatose state. Subsequent observation of a number of these patients with allergic nasal membranes in which the excitant, such as an inhalant or food allergen, had been eliminated by the allergist as well as a subsidence or eradication of the infection by surgery, only a hyperplasia of the nasal membranes persisted with no evidence of allergic reaction. In several cases, however, the excess watery or mucoid discharge and the edema subsided, but the membranes retained a pale and sometimes a bluish discoloration. One case upon examination presented allergic nasal membranes on one side but atrophic membranes on the opposite side. Another patient with a 4+ Wassermann reaction had a complete atrophy and destruction of the septum and of the turbinates on both sides. Several cases with hyperplastic sinus and nasal membranes were examined repeatedly on separate occasions, but at no time was there observed an allergic reaction of the nasal membranes. It will be especially interesting to continue a close follow-up on the latter type of case over an extended period of time for the possible occurrence of an allergic reaction of the nasal membranes and endeavor to determine the causative excitant in a given case.

Clinically, antral lavage offered an interesting study. The return flow from the antra of those cases with a hyperplasia and a rather mild allergic reaction of the nasal membranes was either clear or contained small globular masses of "mucopus" and occasionally, but uncommonly, copious masses of mucopurulent material. Frank pus was found in the antral washings of only a few cases with hyperplastic sinus and nasal membranes without evidence of an allergic reaction. To determine the significance of the latter observation considerable further clinical investigation and bacteriological and pathological study is essential. In those individuals presenting more pronounced allergic membranes, the mucus content of the substance evacuated from the antra was noticeably increased. In those cases with violent allergic reactions the

return flow in several instances consisted of from 5 to 15 cc. of bright clear mucus en masse, which did not mix with the solution and resembled the white of an egg. Repeated antral lavage on alternate days on these cases usually was followed by a reduction in the degree of allergic reaction of the nasal membranes and also a diminution in the amount of mucus evacuated. The less resistance encountered to the flow of solution on repeated antral lavage as well as the reduction in the amount of mucus evacuated suggest a subsidence of an allergic reaction of the antral membranes. Unfortunately, because of the financial status of these particular patients a second or third Roentgenogram of the sinuses was not obtained to confirm this assumption.

A second table (No. 2) is offered, which shows the age, sex, presence or absence of allergic nasal membranes and nasal polypi in each of the 11 cases without evidence of pathological involvement of the sinuses. It is observed that no nasal polypi were found in any case and only two cases presented allergic nasal membranes. These two cases were in the active stage of seasonal hay fever at the time of examination and were subject to asthmatic attacks only during the hay fever season.

TABLE 2.

CASES WITH NO EVIDENCE OF SINUSITIS.

Age	Sex	Duration of asthma	Allergic membranes	Nasal polypi
20	M	15 years	No	No
6	M	2 years	Hay fever	No
49	M	15 years	No	No
28	M	3 years	No	No
23	F	4 years	No	No
25	M	7 years	No	No
15	F	10 years	No	No
6	M	6 weeks	No	No
32	F	1 year	Hay fever	No
18	F	2 months	No	No
17	F	13 years	No	No

This table gives the age, sex, length of time since onset of asthma, the presence or absence of allergic nasal membranes and nasal polypi in 11 cases presenting no evidence of sinusitis.

It is observed that one case in this group has had a history of asthma for 10 years, another for 13 years and two for 15 years without evidence of hyperplastic sinus membranes. The cases with a history of a shorter duration of asthma present an interesting follow-up in view of the possibility of a sinusitis developing at some future time. It will be of especial interest to follow the case of six weeks' duration, the one of two months' and the two cases with seasonal hay fever.

In conclusion it is desired to state that an effort has been made to present the more common rhinological findings with their relative frequency and the steps taken in establishing a diagnosis in this particular group of 100 cases of bronchial asthma.

Acknowledgment is made to Dr. Baldwin and his staff of allergists; Dr. Carty and Dr. Schwartz, radiologists; Dr. Wheeler, bacteriologist; Dr. Foot, pathologist; and Dr. Palmer, of the Department of Otolaryngology, for their most courteous co-operation in making this study possible.

SUMMARY.

1. All cases included in this report had a complete history, physical examination and sensitivity tests made by the allergist with a diagnosis of bronchial asthma established.

2. The rhinological findings, based on X-ray reports of the nasal accessory sinuses, show that 89 per cent of the 100 cases of bronchial asthma have a chronic hyperplastic sinusitis involving one or more sinuses. The remainder, or 11 per cent, show no evidence of sinusitis.

3. Sixty of the 89 cases with a chronic hyperplastic sinusitis presented allergic nasal membranes and 23 of these patients were found to have nasal polypi.

4. Antral lavage revealed that in those cases with definite allergic reaction of the nasal membranes the mucus content of the washings was relatively increased over that which was observed in cases with simple hyperplastic membranes. This suggests the presence of an allergic reaction of the antral membranes.

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525 East 68th Street.

CLEVELAND CLINIC APPOINTMENT.

Dr. Paul M. Moore, formerly Assistant Professor of Otolaryngology at the University of Iowa, has been appointed to fill the vacancy at the Cleveland Clinic caused by the death of Dr. William V. Mullin.

INTERLOBAR ABSCESS PROBED AND DRAINED THROUGH THE CRIBRIFORM PLATE. CURE OF ASTHMA.*

DR. IVIMEY DOWLING, Albany.

The March, 1926, issue of *Annals of Otology, Rhinology and Laryngology* carried an article, "An Unusual Finding," by Dr. S. R. Skillern, Jr., portraying an unusual case in which it was accidentally discovered that a probe could be passed into the cranial cavity to a depth of 7¾ in.

Quoting from Skillern: "The probe had passed into the skull above the sphenoid sinus through what was evidently a dehiscence in the posterior ethmoid capsule, or through an unusually large posterior ethmoid foramen, situated in the fovea ethmoidalis at its junction with the orbital plate of the frontal and lesser wing of the sphenoid."

This procedure was first performed by Dr. Samuel Skillern, repeated by Dr. S. E. Skillern and Dr. Ridpath.

This patient was under treatment from Nov. 17 to Dec. 29, 1924, when he was discharged from the hospital. The patient reported for observation on Jan. 11, 1925, and later returned to the hospital and finally developed increasingly severe headache, passed into coma and died Jan. 20.

Dr. Skillern reported autopsy findings as follows: "The brain showed no signs of injury or meningitis, nor did the meninges, through which the probe had apparently passed. In fact, they both appeared to be normal to microscopic examination.

"Now comes an interesting detail: A minute examination of the dura covering the entire fovea ethmoidalis failed to show any sign of perforation or injury. When this was stripped off, the underlying bone was of a darker bluish color than normal, but search as I would, I could not find where the probe had passed through any opening, from the cribriform

*Read before the New York Academy of Medicine, Section of Otolaryngology, May 20, 1936.

Editor's Note: This ms. received in Laryngoscope Office and accepted for publication, July 14, 1936.

plate to the sella turcica, excepting the posterior ethmoid showed degenerated polypoid purulent masses on the right side. The right frontal and left ethmoidal cells showed a hyperplastic condition of the mucous membrane, the left frontal and sphenoid being normal. The question now arises, what happened to dehiscence of bone through which the probe passed. From the color and general appearance of the bony plate covering the ethmoid cells, it was diseased throughout, and yet apparently Nature had closed over the original bony dehiscence, if one was present at the time of the operation."

The report of this case interested the writer and was vividly recalled at a later time when Dr. Fenton Taylor called him in consultation to treat a brain abscess "draining through the nose," for such was his message. At the time it seemed impossible that such could be the case, but when the patient was seen at the Artists Colony at Southampton in the early morning of Oct. 1, 1930, he was in coma with pus pouring from the left nostril in *successive pulsations.*

This was unlike anything he had ever seen before and served to recall Dr. Skillern's case, so search was made for some hole in the roof of the nose through which the pus could discharge from the cerebral cavity. This was easily accomplished and a large sized sphenoid probe was passed through the cribriform and felt to pass without resistance into the cerebral cavity. At the time of entrance there was a more rapid gush of pus and the source of the patient's coma was then believed to be due to an abscess of the frontal lobe of the brain.

The following record was made at this time: "Consultation with Dr. Taylor. *Provisional Diagnosis:* Cerebral abscess left frontal lobe. Much treatment over long period. Had previously been under care of Dr. Elsberg and Dr. Tilney, New York; Dr. Spiller, Philadelphia; and many others. Diagnosis was uncertain.

"In swimming Monday (today is Wednesday) and about in good state. Taken with coma and gradually elevating temperature up to 105.4° when the writer saw him at 6:45 A. M.

"*Examination: Ears,* negative. *Nose,* left ethmoid block. Pus both right and left nares, mostly left, from which about

one cup of thick yellowish pus flowed rapidly and spontaneously this A. M. (about 5 A. M.).

"*Eyes:* Pupils O. D. 3½ mm., O. S. 4½ mm. Fixed and no reaction. Hand-slit lamp showed cornea normal. Lens markings abnormally distinct. Eyeballs fixed and turned slightly toward nose, being almost in state of parallelism in lieu of normal cadaveric position.

"*Transillumination:* Sinuses, frontal, clear; maxillary, clear infraorbital areas. Ethmoids (intranasal illuminated) clear.

"Left naris probed and engaged apparent sinus leading into the cerebral cavity, entered between the septum and anterior portion of the middle ethmoid body. Pus oozed as probe was withdrawn."

All things considered, the writer was forced to agree with Dr. Taylor in that we were dealing with a true brain abscess discharging spontaneously through the cribriform plate.

Treatment was then instituted in accord with this conclusion. The sneezing reflex from use of an argyrol tampon was obtained but there was no ocular reaction, which is so frequent in sinus disease. The erectile tissues of both nostrils were shrunken with cocain and the entrance to the cerebral cavity repeatedly probed and suction applied with the happy result that drainage was sustained, the coma disappeared and restoration to apparent health established. The patient died at a later period (one and one-half years) in Paris.

The following day consultation with Dr. Tilney and Dr. Elsberg served to complete the observation and direct treatment.

Dr. Tilney and Dr. Elsberg presented very complete records of former observations, for this patient had been under observation for a long time on a previous occasion at the Neurological Institute and a tentative diagnosis of brain tumor was made.

Through courtesy of Dr. Tilney the following resumé of the case is presented: "d. S. P., New York, male, married, age 46 years. Admitted June 21, 1930; discharged July 10, 4:20 P. M.

"Patient had a depression lasting from January, 1929, to February, 1930. Under the care of Dr. Strecker, of Phila-

delphia, elaborate work-up showed only a slightly lowered basal metabolism and some anomaly of the sugar tolerance test — said to be definitely not diabetes.

"In February, 1930, he returned to work, apparently in perfect health. There were no symptoms until about June 1. At that time he began to be somnolent in the afternoon. He would come home from work about 4 P. M., take off his clothes and immediately fall asleep. He could be roused with difficulty for dinner, but when once aroused remained awake until about 10 P. M. This occurred daily until June 20. That evening he was aroused with more difficulty and went to sleep earlier than usual. Toward evening he could not be aroused. Since then he has been in a stupor, which has slowly deepened and persisted to the present time. No diplopia, headaches, vomiting, polydipsia, polyuria, difficulty in walking, or weakness of extremities. No elevation of temperature.

"This morning a dropping of the left corner of the mouth was observed by his family. Urine negative when examined by Dr. Lambert this A. M. Deep reflexes quite active and equal when examined by Dr. Lambert on June 21."

LABORATORY REPORTS.

Blood Count (June 23, 1930): Hemoglobin, 89; color index, 0.9; R.B.C., 4,900,000; W.B.C., 12,000; polynuclears, 75; lymphocytes, 20; large monos, 1; eosinophiles, 2; basophiles, 1; trans. parasites, 1.

Blood Count (June 25): W.B.C., 12,200; polynuclears, 78; lymphocytes, 18; large monos, 3; eosinophiles, 1.

Blood Chemistry (June 23): Urea mg./100 cc., 31.2; uric acid, 6.3; sugar, 86 per cent.

Blood Chemistry (July 3): Sugar, 85 per cent.

Blood Serology (June 23): Wassermann (crude), negative; Wassermann chol., negative; Kahn, negative.

Urinalysis (June 25): Twenty-four hour volume. Color, amber cloudy; reaction, acid; sp. gr., 1022; albumen, negative; sugar, v. ft. trace; casts, some; other cells, few W.B.C.; other crystals, occ. epith., cal. carb.

Urinalysis (June 26): Color, amber cloudy; reaction, al. acid; sp. gr., 1022; albumen, V.F.G.; sugar, negative; other

cells, occ. cylns., 6 W.B.C. per H.P.F.; other crystals, few epith. sq., some urates.

Urinalysis (July 7): 165 cc.

Spinal Fluid (June 2): Appearance, clear and colorless; pressure, 95 mm.; cells per cc. mm., 3; globulin, 0; protein mg./100 cc., 37; sugar, mg./100 cc., 64 gm.; chlorides, per liter; gold cure, 0—; Wassermann (crude), 0.2 cc. negative, chol., negative; Wassermann (crude), 0.4 cc. negative, chol., negative; Wassermann (crude), 1.0 cc. negative, chol., negative; Wassermann (crude), 2.0 cc. negative, chol., negative.

Basal Metabolism (July 9): Height, 68¾ in.; weight 146 lbs.; pulse rate, 66; B.M. rate, —7.

Sputum Examination (June 26): Gram. smear showed an abundance of pneumococci without capsules. Type I, no agglutinations, clear. Organisms belong to Group IV; Type II, no agglutinations, clear; Type III, no agglutinations, clear.

X-Ray Examination (June 6): AP PA and left stereo of the skull *show a vault of average thickness* and not unusual in size or shape. There is no definite evidence of increased intracranial pressure and the vascular channels and sutures do not appear abnormal. The sella is shallow, wide open and not deformed. The anterior clinoid processes appear normal. The mastoids are both well developed but many of the cells are poorly aerated. The pineal is in the midline stereoscopically and by measurements is in its normal position. The sphenoid and petrous ridges appear equal. The frontal sinuses are quite small.

Impressions: No localizing signs of tumor or disease.

G. C. DYKE, M.D.

"*Consultation Record* (June 27): Today physical examination is possible where it was not possible a few days ago when he was in deep stupor. At that time all of the tendon reflexes had disappeared and the pupils did not react to light. Today he responds and is cooperative. The pupils are equal and react fairly well to light and accommodation; when looking to the extreme right there is rather coarse nystagmus; when looking to the extreme left there is fine and rapid nystagmus. Upward movements are a little large and the temporal

margins of the discs a little blurred. Power in all extremities is distinctly more active than those on the right. No Babinski or any of its confirmatories. There is no evidence today of any left facial weakness. There is no rigidity of the neck and no Kernig.

"The question whether the patient has a right frontal neoplasm cannot yet be answered with certainty. One must wait until the bronchopneumonia has entirely subsided.

"DR. ELSBERG.

"Consultation by Dr. Elsberg, Dr. Pepper, Dr. Stengel, Dr. Franz, Dr. Lambert and Dr. Klingman, June 28. The conclusions arrived at were the following: That nothing could be definitely determined regarding the presence of or the location of the presumed neoplasm until the pulmonary complication had cleared up; that then, if necessary, an air injection might have to be done.

"Personally, I feel that with this the others were in agreement, that there was considerable probability that the mental disturbances from which the patient suffered 14 months ago were connected with the present trouble, that the attacks were confusional in character, and that the taking of lysol may well have been confusional, the patient not knowing what he was doing at the time and thinking he was using a gargle he may have swallowed some of the lysol. From the description of what happened afterwards, he must have taken whatever he did take in a diluted form — he was able to sit down at breakfast with his family and only vomited and became unconscious after a time.

"It is perfectly possible that this was an epileptic equivalent as were some of the other confusional attacks from which the patient suffered, in one of which at least, according to Dr. Pepper, there was a trembling of all extremities. It is also possible that the convulsive seizure may have preceded this last attack of unconsciousness, which was followed by a pulmonary complication.

"The disturbance of sugar tolerance, found by Dr. Stengel, as well as his attacks in which he slept a great deal, may be brought into connection with the hypothalamic region and the left-sided signs he now presents may well be brought into

harmony with these signs; *i. e.*, a tumor deep in the right frontal lobe, causing involvement directly or by pressure upon the hypothalamic region. How correct this supposition is will have to be determined in the future.

"CHARLES A. ELSBERG, M.D.

"June 22: Patient brought to institute at 1:30 P. M. Lumbar puncture showed clear, colorless fluid. Pressure 95 mm. Prompt rise and fall of jugular compression. Two hundred cc. of 25 per cent glucose given intravenously. Patient had a chill about one-half hour later. At present (7 P. M.) condition is unchanged, except that he tried to push the examiner away with either hand equally well when his head is manipulated. To be cared for by Dr. Tilney. DR. FRANTZ.

"June 22: 10 P. M. Patient reacts slightly to stimuli, opens his eyes occasionally and moves his head. There was an involuntary urination of a large quantity of urine this evening. Following administration of glucose this was a moderate reaction consisting of severe chill, increased pulse rate and respiratory rate and cyanosis. This lasted for about one-half hour, following which there was a rise in temperature.

"June 23: Condition much the same. Can be aroused slightly and makes slight response to stimuli. There is considerable throat moisture but no pulmonary congestion. Examination this morning shows reflexes in the lower extremities being active and equal. In the upper extremities the reflexes are greatly diminished on both sides. The left facial is still very noticeable B.P. 98/60. Impression is that patient's condition is unchanged from yesterday. DR. KLINGMAN. 1:30 P. M.

"Left extreme lung base has a few crackling rales; temperature rising and also respiration.

"June 23: Slight dullness, diminished breath sounds and few rales after coughing at angle of scapula. DR. LAMBERT.

"June 24: Signs at right base a little more marked.

"DR. LAMBERT.

"June 25: This morning patient responds to questions at times. Recognized his wife last evening, smiled a few times and attempted to answer questions. Examination this morn-

ing shows bronchial breathing over left lower lobe and intrascapular region. Temperature not as high and respiratory rate falling. He has been able to take fluids in small quantities by mouth now. He was given short 75 cc. of saline intravenously last evening. DR. KLINGMAN.

"June 26: Patient brighter this morning and at times is quite clear mentally, realizes where he is and that he is seriously ill. He has no specific complaints other than that he feels sick. No headache. Chest still shows area of consolidation in left lower lobe. He is expectorating small amounts of purulent sputum; slightly brownish tint. This evening there has been some hiccough. DR. KLINGMAN.

"June 27: This morning patient is brighter than at any previous time. Spoke of having been a patient of Dr. Stengel in Philadelphia and that a very extensive study of his case had been made there and that he felt we should communicate with Dr. Stengel about him. He was able to cooperate very well in a brief neurological examination. DR. KLINGMAN.

"June 29: Signs in chest are clearing. Dullness, few rales, diminished breath sounds and absence of fremitus without bronchial voice or breathing suggest the possibility of fluid, but I think we should wait before doing any exploration.

"DR. LAMBERT.

"July 5: General condition improved, thoroughly conscious, co-operation perfect. No confusion. Mentally alert and normal. Respiration, normal. Temperature, normal. Reflexes deep, are equal and active, 3+ but all definitely present. Superficial abdominals both sides questionable. No Babinski or modifications; no clonus; no Hoffman. Muscle strength normal. Finger to nose, finger to heel to knee, all are normal. General sensory for vibration, touch muscle-joint, stercognosis, normal. Olfactory differentials but does not identify different odors. Conclusion: No olfactory defect. Vision normal; reads paper without blurring; pupils dilated but react to light and convergence; no ptosis. No nystagmus. Hearing normal in both ears; no tinnitus or adventitious sounds; B greater than A on both sides. A suspicious left lower facial weakness, especially on smiling, and not shown on volition or in repose. Tongue in midline coated. No difficulty in swallowing. No voice changes.

No difference in neck movements. No tremors or twitchings. Left lung still has slight bronchial breathing.

"DR. TILNEY-DR. KLINGMAN."

In addition to the reports from the records of the Neurological Institute, the following exchange of letters between Dr. J. Spencer Browne and Dr. Frederick Tilney are of value:

"84, Fg. Saint-Honore, Paris.

"March 31, 1932.

"Dear Dr. Tilney:

"I know you were much interested in the case of the late Mr. d. S. P. and I had read the report of his illness in America. I have, therefore, considered it opportune to furnish such details as I can with regard to his recent, very sudden death. I had never attended Mr. P. but had met him on one or two occasions, as I was treating one of his daughters for a mild attack of typhoid. He seemed to be in perfect health, in fact Mrs. P. rejoiced, in speaking to me at the time, that her husband was and had been so well since his return to France, and at the time I thought she had every reason for so doing, bearing in mind the severity of his recent illness.

"Early on March 16 I was called urgently to see Mr. P., who was described as being in a state of coma. I had spoken to him on the telephone the afternoon before and he seemed to be in normal state. He had returned home, dined moderately, had taken a bath and had retired to bed, not giving the slightest sign for alarm. About 5 A. M. his wife heard him breathing stertorously, waited a while, then summoned the nurse and sent for me.

"I found him lying perfectly tranquil on his right side, the legs extended. It was completely impossible to rouse him. Pulse very rapid, almost imperceptible, with no tension, respiration shallow but slow. Reflexes completely absent. Pupils equal and widely dilated (fundus not examined). Extremities cold. Warmth was applied, 2 cc. camphorated oil injected. I was preparing fresh stimulants when the breathing died away. The heart stopped, just as in a case of chloroform poisoning. I attempted artificial respiration but all was of no avail. He died one-half hour after my arrival, as I was

examining him. There was no relaxation of the sphincters and the air passages were perfectly clear.

"A brain surgeon had been summoned, all had been prepared for a surgical intervention, but too late.

"According to the notes, it would appear that Mr. P. suffered in America from a (?) subdural abscess of pneumonic origin, which had discharged by ethmoid (was a culture made of the pus?). There seems to have never been any sign of a cerebral tumor. But evidently there had been signs of intracranial pressure. The immediate cause of death seemed to be bulbar with sudden pressure causing inhibition of the respiratory centre. At the moment of death there was considerable cyanosis of the vessels at the root of the neck.

"In the absence of any prodromal symptoms whatever and with regard to the history of the case, it is indeed difficult to make a precise diagnosis of the cause of death. The impossibility of a postmortem is to be lamented. Can it be imagined that a slow thrombosis of the basal veins brought about the final and lamentable result?

"I must apologize for writing so prolific a letter with so few useful details but I thought it would be well to complete as far as possible the history of the case.

"Yours very truly,

"DR. H. SPENCER BROWNE."

"May 23, 1932.

"Dr. H. Spencer Browne,

"84 Faubourg St., Honore, Paris.

"Dear Dr. Browne:

"I hope you will forgive the long delay in replying to your letter with reference to Mr. P. I am enclosing a complete record of our examination for your files.

"The last attack which you so graphically described was in almost all of its general details similar to those which had occurred before. In each instance there had been much respir-

atory embarrassment after the attack and profound coma lasting for several days.

"You will note in the history under date Aug. 29, 1930, that there was an attack of coma which lasted 12 hours and he gradually cleared in the next 12 hours. Under date Oct. 1, 1930, he was again found in coma and after 18 hours discharged through the left nostril an estimated amount of thick, white, creamy, foul-smelling pus, about 6 to 8 oz. On this occasion he remained in coma six days, during which time he had a definite pneumonia of the right upper lobe and left lower lobe. The pus discharged was not successfully collected and no culture was made so far as I know. Mr. P. was then in Southampton, L. I., at his summer residence.

"Thank you very much for the courtesy of sending me your notes to complete my record. I trust that the copy of our study may shed some further light on the occurrences preceding Mr. P.'s death.

"With kindest best regards,

"Sincerely,

"FREDERICK TILNEY."

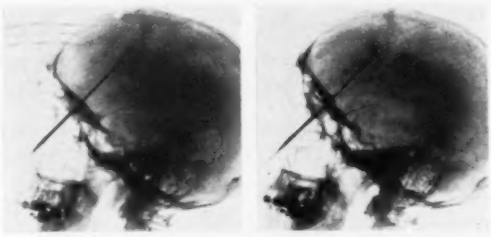

Fig. 1. J. P. H. Probe through cribriform plate.

Although treatment at the time of this attack was seemingly successful no positive diagnosis was ever established because the symptoms at various times were unusual and unlike anything the writer had ever seen. Unfortunately, no autopsy was obtained in Paris, and so this case must be recorded as one of successive recoveries without accurate diagnosis.

The point to be remembered is that there was another case in which a probe could be passed for a great depth into the

cerebral cavity without eliciting untoward symptoms, *but in this instance the probe was known to enter through the cribriform plate.*

An unusual observation made was the fact that the pupils were widely dilated, eyes fixed, and a papilloedema present in both eyes measuring 6 D.; *however, the edema of the disks was most unusual,* for it varied from a mere blurring of the margin to an edema measuring 6 D.; *that is, the edema was transient and recurring.*

This was the first time the writer had observed transient edema of the optic nerve to such a high degree and so that such might be a fact was stored in his memory, and the time

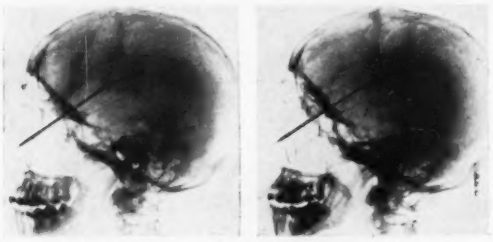

Fig. 2. J. P. H. Probe through cribriform plate.

came when it proved most helpful in aiding to establish a correct diagnosis in the case about to be reported.

The patient, J. P. H., was referred by Dr. Fred Doescher for relief of asthma. The date of consultation was April 20, 1931.

Otolaryngological Examination: Nose: Septum large perforation of cartilage. Upper portion of septum thickened and in contact with turbinated bodies with resultant ethmoid block and interference with drainage and ventilation of all sinuses. Membranes highly congested. Moderate mucopus and postnasal drip.

Oropharynx: Some missing teeth, many fillings but gums and remaining teeth in good condition as result of recent care by Dr. Edward W. Briggs. The tonsils had been removed in 1923. *Larynx* and proximate parts negative except for congestion of the trachea.

Eyes: Vision, O. D. 20/30x20/15; O. S. 20/30x20/15. *Fundus Findings:* Transient recurring edema of the optic nerve disks.

The clinical history of the patient is best recorded in his own words stated in a letter in response to request by the writer. It is as follows:

"Albany, N. Y., April 16, 1936.

"Dr. J. I. Dowling,

"116 Washington Avenue,

"Albany, N. Y.

"Dear Dr. Dowling:

"In response to your request for a brief outline of my case prior to the operation performed by you in 1931, it is my

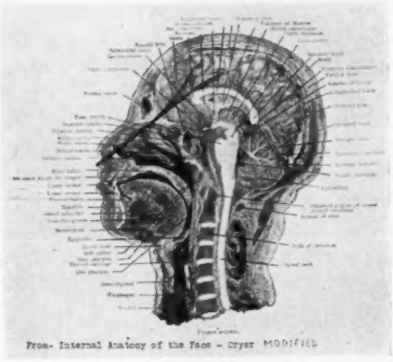

Fig. 3.

impression now that I have had an asthmatic condition since childhood, although it was never recognized as such.

"As a boy, work which required much physical effort brought on labored breathing, particularly so if the air was frosty. Sleeping in a cold room often brought on such attacks in the night, but they subsided after an hour or so. The most severe attack I recall was in 1924 when I started out to attend a political meeting in Harmanus Bleecker Hall. The walks approaching the hall were lined with red flares which threw off fumes that choked me so that I was unable to stand. For

the period of one-half hour or more I sat on the curb or lay on my face on the sidewalk near the Armory. My sister, a hospital superintendent, who was with me at the time, ran to a drug store and secured some pearls of amylnitrate which shortly relieved me so I was able to get into my car and go home. I was thoroughly exhausted after this attack but was able to go to business on the following day. I was in a rather poor physical condition at this time. In January, 1925, my tonsils were removed and after spending a month in Florida was sufficiently recovered to return to work.

"Early in 1931 I began having more serious labored breathing at night, often awakening once or twice and being up for an hour or more. I was under the care of Dr. Doescher at that time. In February, 1931, I made a trip to Chicago and Detroit and on the evening of my return had occasion to use my car and found the garage doors blocked by snow and ice. I worked for one-half hour or more with pick and shovel, removing the ice and snow in order to open the doors of the garage. It was quite an effort, and the results were not so good, for shortly thereafter the night attacks became more severe. For several weeks I was unable to lie down at night. The attacks started soon after sundown and continued until after sunup; breathing was very heavy and I perspired profusely. One night in particular I recall Dr. Doescher was called and administered morphine pills or tablets, waited an hour or more and gave a second one — neither had any effect. He then gave me a hypodermic of morphine and left, saying that couldn't fail to quiet me; that also failed.

"At about this time Dr. Gorham gave me a number of tests, allergic, some 20 different kinds as I remember, to determine if possible the cause of the trouble — all were negative.

"I do not recall exactly when you and Dr. Kemp came into the case, but at that time treatments were changed and shortly thereafter the operation was performed. It is unnecessary for me to go further than this except to say that I have had no recurrence since that time.

"Sincerely,

"(Signed) J. P. H."

At this time postnasal drip and expelling of mucopus with persistent cough were the most annoying symptoms. There

were no ocular disturbances, nor any headache beyond an early A. M. discomfort.

Asthmatic symptoms had been increasingly severe, so that at the time of first consultation emergency measures for relief of bronchospasm was all that could be done.

Physical examination reported by Dr. Clinton Hawn was negative as to organic disease of either the heart or lungs, which was sustained by the following Roentgen report:

"Albany Hospital, Roentgen Ray Department; name, J. P. H.; doctor, Dr. Hawn; date, May 15, 1931.

"Roentgen report: There is a slight diminished transmission of rays through the right antrum, suggesting thickened membrane. The anterior ethmoids on the left side are not clear. The other sinuses are normal.

"The lungs were negative. The heart is normal in size. The right costophrenic angle is not clear.

"(Signed) W. P. HOWARD."

At time of bronchospasm seizures there was the usual moist crepitant and large rales throughout the chest and in the attacks the bronchial symptoms always started in and extended through the right side of the chest, then to the opposite chest. This is an interesting and valuable sign observed in many cases by Dr. Burton Haseltine, the writer and others. *The point of this observation is that bronchospasm always begins on the side of dominant sinus pathology with greatest ethmoid block. Extension is but a part of the picture. This point is practical clinically because it serves to suggest to the diagnostician the likely sinus complication acting as chief excitor of the bronchospasm attacks.*

Dr. L. Whittington Gorham reported many allergic tests negative.

After a short period of emergency and preoperative treatment, consultants were agreed that sinus surgery was indicated, so on June 2, 1931, a right ethmoidectomy and double maxillary ventilation was performed. At the time of operation a sphenoid probe was passed in two directions to a depth of 12 and 14 cm. into the cranial cavity.

Postoperative Treatment: Daily probing through the cribriform plate in order to promote free drainage of the cerebral complications. Argyrol tamponage by the Dowling method with suction and nasal irrigation resulted in sufficient improvement to permit discharge from the hospital on June 13, 1931.

The patient continued to improve, although after leaving the hospital he suffered a few mild asthmatic attacks, the final one being July 27. Since that date he has improved in health, plays golf, and enjoys the usual activities of a healthy man and performs his duties as an executive.

The reports of Memorial Hospital record: Wassermann negative and repeated urinalyses were also negative.

At various times cultures from the drainage from the cerebral cavity were examined and the records are signed by Dr. Arthur W. Wright, of the Bender Laboratory, and reported hemolytic staphloccus aureus.

Postoperative Roentgengrams, showing probe in place within the cerebral cavity, were made July 7, 1931, and Dr. Donald D. Prentice submitted the following report:

"There is a probe extending upward and backward for a distance of 14 cm. from the anterior wall of the nasal fossa through the cribriform plate of the ethmoid bone.

"There is a second probe extending upward and backward for a distance of 2 cm. and extending through the same region but above the first probe.

"The cribriform plate of the ethmoid bone shows marked changes of an osteoporotic nature.

"Roentgen Diagnosis: Osteoporosis of cribriform plate of the ethmoid with sufficient erosion to cause communication with the cerebral cavity.

"(Signed) DR. DONALD D. PRENTICE."

This was the third case known to the writer in which a probe had been passed through the cribriform plate far into the cranial cavity without damage to the patient. Search of medical literature by Miss Babcock, librarian at the state library at Albany, failed to find any other similar report.

However, further search finally discovered that Dr. Voislawsky had had such a case, and by his courtesy I include an

extract from the minutes of the New York Laryngological Society of Monday evening, Nov. 12, 1928. Dr. Wesley Hunt, then secretary, furnished the following quotation:

"Minutes New York Laryngological Society, Monday Evening, Nov. 12, 1928: Dr. Voislawsky demonstrated X-ray pictures of the head of a patient who had been operated on for sphenoiditis and ethmoiditis, which showed a probe penetrating the cranial cavity to the distance of 7 to 8 inches. The operation had been performed two or three weeks ago. Up to the present time no ill results followed.

"*Discussion:* Dr. Faulkner spoke of four cases of sudden death in patients suffering from sphenoiditis. The cause, in his opinion, was probably the rupture of a subcortical abscess.

"Dr. McCullagh spoke of a case which had been under his care, where the patient had driven an applicator, placed in the nose, backward and upward into the cranial cavity. No ill results had followed.

"Dr. MacKenty reported a case where the cribriform plate had been penetrated. There were no symptoms for four weeks and then meningeal symptoms developed and death took place, probably from abscess.

Available information indicates that *in toto* there have been six cases in which a probe has been passed through the roof of the nose without immediate ill results but four of the cases are reported as curiosities without suggestion concerning any method of treatment; however, the two cases now reported were benefited by repeated probings and suction to withdraw intracranical mucopus.

In the writer's first case the patient lived for over a year, and the second case still lives in good and useful health after five years since operating.

Analysis of symptoms of all these cases would be valuable but all that can be said is that two of the patients finally died in coma, *viz:* the case reported by Dr. Skillern and the patient seen by the writer through courtesy of Dr. Fenton Taylor and so carefully studied by Dr. Tilney and Dr. Elsberg. The case reported by Dr. Voislawsky was alive two or three weeks after the operation but no follow-up record is at hand.

Dr. Mackenty's case is recorded as having developed meningeal symptoms and death resulted from "probable abscess."

However, in the two cases herein discussed there was a single symptom that may prove of future value, which was the *transient and recurring edema of the optic disks.* The obvious suggestion is that ophthalmologists who may observe such symptoms might refer such cases for rhinological study and cranial Roentgen report.

The diagnosis of the case which has been discussed is based upon the fact that a probe was passed through the cribriform plate of the ethmoid into the cranial cavity and from this point of entrance mucopus was drained and culture made. Stero-Roentgengrams located the probes as passing between the hemispheres of the cerebrum and above corpus collosium.

The procedure of repeated probings is surgical, for it serves to sustain drainage at the most pendant point in the majority of positions that may be assumed consciously or unconsciously by the patient. Actually, the condition is analogous to epidural abscess so frequently met in mastoid surgery, and perhaps in the future rhinologists may recognize this condition more often and develop technique that will become routine for exploring the roof of the nose and treating such cranial complications when present.

The three illustrations of this text demonstrate very nicely the two positions of the probe located in the extradural space between two cerebral hemispheres above the corpus collosum. The first two plates should be studied with the aid of a stereoscope which shows the point of entry to be a large or eroded foramen beside the cristi galli, through which one of the nerve prolongations pass from the olfactory bulb above to the nasal membrane beneath the cribriform plate. The third is a diagrammatic modification of a plate from Cryer's "Internal Anatomy of the Face" and is used by permission of the publishers, Lee & Febiger.

It is a pleasure to acknowledge the courtesies and co-operation of the many who had to do with these cases and in the instance of J. P. H., the unfailing and valuable assistance of Dr. Roy Cleon Kemp.

116 Washington Avenue.

THE EFFECT OF INTRANASAL PHENOL APPLICATION IN HAY FEVER. QUANTITATIVELY STUDIED BY A NEW INTRANASAL SWAB TEST WITH POLLEN EXTRACTS.*†

DR. FERNAND VISTREICH, New York.

Until the year 1911, the history of the treatment of hay fever presented the most varied armamentarium. In that year, after Noon and Freeman's success in treating hay fever by active immunization with pollen extracts, the allergic method replaced the fantastic line of empirical remedies. Ever since, it deservedly held its place as the only etiological and scientific treatment of the malady. This method, nevertheless, presents some difficulties, a fact which is the reason of the ever present tendency to devise new methods or revive old procedures. One of these methods is the chemical cauterization of the nasal mucous membrane.

Chemical cauterization of the nasal mucosa was recommended as early as 1837. Since then, the use of carbolic, nitric, chromic and acetic acids have been mentioned in the writings of Browne, Logan, Cheatham, Crippen and others. In more recent years Chandler,[1] Spivacke,[2] Palmer[3] and Tumarkin[4] have reported good results with intranasal phenol application in the treatment of hay fever and hyperesthetic rhinitis as well.

Though this mode of therapy has unquestioned merits, there are several factors which militate against its readily attaining the position of importance it deserves in the treatment of hay fever. These are: *1.* The absence from the literature of any satisfactory description of its technique and of a detailed analysis of its effects. *2.* The lack of a reliable quantitative method for estimating the beneficial results obtained — mere clinical observation alone proving unsatisfactory. *3.* The purely empirical nature of this treatment. *4.* The impression,

*Read before the New York Academy of Medicine, Section of Otolaryngology, April 15, 1936.

†From the Department of Otolaryngology of New York Hospital, Cornell Medical College.

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current within the profession, concerning its supposedly drastic nature and a few others of less importance.

Of these factors, the first two merit serious attention. The present study was undertaken with this end in view. It should be readily apparent that if a satisfactory description of its technique and effects will be supplied and a reliable quantitative method for the estimation of the results can be devised, the treatment, quite spontaneously, will come into its own.

TECHNIQUE.

The technique of intranasal phenol application is relatively simple; however, there are a few essential details which make its detailed description necessary. Concentrated U.S.P. phenol is used. A surface anesthesia is of definite advantage but not strictly necessary. Both sides of the nose should be treated in one session. To prevent the dilution of phenol by nasal moisture, the excess of mucus must be removed before and during the treatment. This is best accomplished by the nasal suction tube. The application is done by means of cotton applicators, which should be well soaked in phenol, but not dripping when introduced. In most cases, two fresh applicators will be necessary on each side. Contact between phenol and the mucous membrane must be thorough. A timid, superficial application will not be effective. The applicator should be led with moderate force over the entire mucosa except for the olfactory region, which must be carefully avoided.

The blanching which appears in the pathway of the applicator may be misleading, as it may be due not only to the coagulation of the surface of the membrane, but also to a white precipitate resulting from the interaction of mucus and phenol, a phenomenon which can readily be demonstrated in the test tube. In such a case, when the precipitate collects at the low points as a milky fluid, the mucous membrane appears in almost the same color as before the application. Naturally, the application must be repeated until the mucous membrane becomes permanently blanched.

The pharynx and nasopharynx, as well as the skin of the nostrils and upper lip, must be protected from the action of phenol. For this reason, it is important to instruct the patient not to allow moisture to run down his pharynx. For protec-

tion of the exposed skin areas it is convenient to cover them with rubber cement. This thin rubber film is impermeable to phenol.

When the application is completed, a light cotton plug, slightly moistened with alcohol, is put in each nostril and the head is bent downward and forward, in order to direct the discharge outward.

The entire treatment should be carried out calmly and unhesitatingly. All these details must be rigidly attended to if the maximal benefit is to be obtained and the undesirable effects reduced to a minimum.

ANALYSIS OF EFFECTS.

1. Local Reaction: In addition to the blanching, edema and rhinorrhea are the immediate effects of intranasal phenol application. The degree of nasal obstruction will depend partly on the edema and partly on the anatomical peculiarities of the nasal cavity. Sneezing is likewise one of the immediate reactions, occurring, however, only in a small fraction of cases. The attack may consist of only a few sneezes, but in some instances may last 10 to 20 minutes.

If the application is not made with sufficient skill to avoid postnasal invasion of phenol, congestion and edema of pharynx and larynx of varying degrees will develop. If the skin of the nostrils and upper lip are not protected, superficial dermatitis will be the result. These should be considered rather accidents than characteristics of the procedure. The dermatitis usually heals within five or six days, leaving no scar and the pharyngeal reaction lasts but a day or two. These accidents together with the immediate reaction, may cause slight or moderate malaise for 24 to 48 hours, but no prostration. Even sensitive and delicate patients will not need more than a mild sedative to be comfortable.

The acute stage of the immediate reaction will give way to regeneration within 24 to 48 hours. The passages start to open and the surface of the mucosa shows a coat of grayish-white coagulum, which soon will start to separate from its base at the edges. Sometimes the coagulum is thrown off in small portions, in which case it does not appear as a

consistent coat. An insignificant amount of bleeding may occur during the early part of regeneration if the patient tries too vigorously to force open his nose by blowing, thus tearing off the coagulum before separation takes place. The character of the mucus at this stage is not always the same. Sometimes it is clumpy and blocks the passages, sometimes it is scanty and inspissated. The coagulum, if undisturbed, will be thrown off in large lumps after three to five days and soon after the mucous membrane resumes its healthy color, texture and function. The nascent vitality of the mucous membrane is especially evident in cases where degenerative changes were present, as these are also favorably influenced.

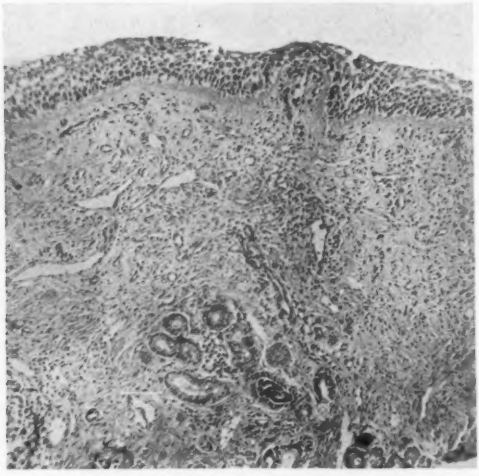

Fig. 1. Appearance of nasal mucosa before phenol application.

The usual histological picture of the nasal mucosa, removed from an untreated hay fever patient, is as follows (see Fig. 1):

The mucous membrane is covered with considerable mucus and there are many droplets of mucus within the columnar epithelial cells. In most cases the cilia are present and readily distinguished. The tissue spaces of the submucosa are wide and filled with a pink staining material, probably edema fluid. The glands in the submucosa are situated at a considerable

distance from the epithelium and contain a rather excessive amount of mucus. There is a rather extensive infiltration of polymorphonuclear leukocytes, a large percentage of which is eosinophilic. Occasional lymphocytes and plasma cells are seen.

The histological picture observed after treatment is as follows (see Fig. 2): The epithelium is intact and there is less mucus in the cells. The cilia can be readily distinguished. There is less, if any, edema, so that the glands of the submucosa are situated much closer to the epithelium. These glands contain less mucus. Most of the blood sinuses are

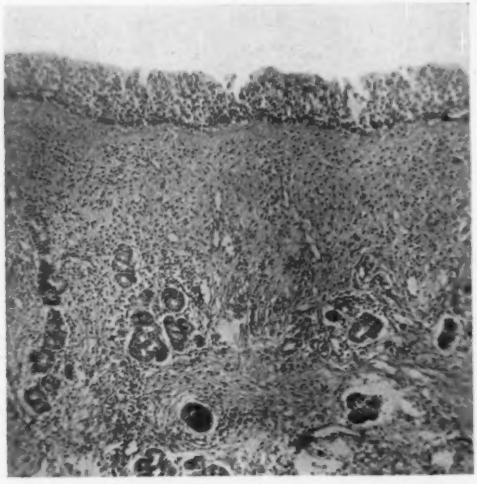

Fig. 2. Appearance of nasal mucosa after phenol application.

collapsed and contain less blood. The cellular infiltration is composed largely of small lymphocytes, plasma cells, occasional mononuclear leukocytes and a moderate number of fibroblasts. Eosinophiles are rarely seen.

Evidence of permanent tissue destruction was never seen either grossly nor on microscopic examination.

2. Therapeutic Effects: The effect of this treatment upon hay fever symptoms presented itself in the following manner: Immediate cessation of sneezing was uniform in the 25 mid-season cases treated. Improvement in clogging and secretory

disturbances become apparent only after two to three days, a circumstance might be expected from what was said concerning the immediate reaction. By the fourth day all of the patients studied in this series had normal nasal function. It is very interesting that the eye symptoms, even if they were very severe, disappeared to the same degree as the other symptoms, giving support to the contention that they are not solely the result of the direct action of pollen upon the conjunctiva, but in great measure to reflex action — the nasociliary reflex.[5] A minor part of the ocular symptoms, which is most likely caused directly, may remain, and is easily relieved with mild astringent collyria.

In four cases which were complicated with pollen asthma and cough, complete relief was also obtained. Four cases, however, are insufficient to permit a general conclusion to be drawn from this point of view.

Three cases were treated before the onset of the season. Two of them remained under observation during the season. Both had 50 to 75 per cent relief. The third made only one telephone report, stating that he had no symptoms. (The question whether it is practical to give the treatment preseasonally will receive attention in a forthcoming chapter.)

Twenty-five of the 28 cases studied came to observation at varying periods during the season, therefore, the balance of the season which they individually faced varied greatly in length. Four had a balance of eight weeks, two had seven, five had six, four had five, six had four, two had three, and two had two. Table 1 summarizes these cases from the point of view of results.

Although this summary clearly shows that substantial relief was obtained in all cases that were followed up, and the number of cases is fairly large, it cannot be considered as the ultimate proof of the effectiveness of this treatment. Doubt is always justified in the light of the numerous factors which naturally cause variation in the severity of hay fever symptoms. The only reliable way of appraising the effect of this treatment is to determine quantitatively whether there is an actual decrease in the sensitivity of the nasal mucosa to pollen after phenol application and if there is, its duration. (The *decrease in sensitivity* is not meant in an allergic sense.)

THE INTRANASAL SWAB TEST WITH POLLEN EXTRACTS.

To answer these questions the effect of serial dilutions of pollen extracts upon the nasal mucosa was studied. By observ-

TABLE I.

a = 90-100% relief. I.F.U. = insufficient follow up
b = 75-90% " with good initial results.
c = 50-75% "
d = no relief

Name	Age Sex	Type Duration	Balance of season	Amount of relief week by week 1.	2.	3.	4.	5.	6.	7.	8.	Total relief	Additional pathology
F.M.	30,F.	Tim. 1Cyr.	2 weeks	a	a							a	
M.G.	40,F.	Rags.5 "	2 "	a	a							a	
D.R.	27,M.	" 1 "	3 "	a	a	a						a	Deviated septum
C.K.	42, F	" 3 "	3 "	a	a	a						a	
B.E.	27,F.	" 1 "	4 "	a	a	a	a					a	Deviated septum
F.S.	39,M.	" 2 "	4 "	a	a	b	b					b	
A.W.	32,F.	" 3 "	4 "	a	a	a	a					a	
C.Z.	38,F.	" 18 "	4 "	a	a	a	a					a	
B.G.	35,F.	" 2 "	4 "	a	a	a	a					a	
H.R.	26,F.	Tim.6 "	4 "	a	a	a	a					a	
E.F.	53,F.	Rags.20"	5 "	a	a	a	a	a				a	Septal spur
M.W.	31,F.	" 2 "	5 "	a	a	a	a	a				a	
S.F.	43,F.	" 2 "	5 "	a	a	a	a	a				a	
P.G.	34,M.	" 4 "	6 "	a	a	b	a	a	a			a	
B.D.	36,M.	" 2 "	6 "	a	b	a	a	a	a			a	
A.B.	39,M.	" 5 "	6 "	a	b-c	b	a	a-b	a			b	
H.W.	37,M.	" 4 "	7 "	a	b	b	a	a	a	a		a	
E.G.	14,F.	" 3 "	7 "	b	b	b	c	c	?	?		c	Deviated septum
E.F.	49,F.	" 7 "	8 "	a	a	d	d	d	d	d	d	d	Polypoesis and chr.sinusitis
Fr.S.	42,M.	" 2 "	8 "	a	a	a	a	a	a	a	a	a	
J.K.	48,M.	" 5 "	6 "	a	a	a	a	a	a	a	a	a	
C.G.	56,M.	" 24 "	preseason	c	c	c	c	c	c	c	c	c	
J.W.	20,M.	" 3 "	"	a	a	a	a	a	a	a	a	a	
J.G.	41,M.	" 8 "	"	a	a	a	b	b-c	c	b-c	b	c	septal spur
W.McV.	27,M.	" 3 "	5 weeks	a	?	?	?	?				I.F.U.	Deviated septum
G.K.	37,M.	" 2 "	6 "	a	?	?	?	?	?			I.F.U.	" "
B.B.	25,M.	" 6 "	6 "	a	?	?	?	?	?	?	?	I.F.U.	
D.P.	25,F.	" 6-8"	6 "	a	?	?	?	?	?			I.F.U.	" "

SUMMARY.

Number of cases followed.....24
" " " with " a " results.....18, or 75%
" " " " " b " " ..... 2, or 8.3%
" " " " " c " " ..... 3, or 12.5%
" " " " " d " " ..... 1, or 4.2%
I.F.U. cases.....4

ing the dilution which precipitated an attack of hay fever the actual grade of sensitivity of the nasal mucosa was determined before and after phenol application. The method of investigation was briefly the following:*

*This test was the subject of special study, a more detailed description of which is being prepared for publication.

Pollen extracts, standardized by the Cooke-Stull method, were used. Preliminary shrinking or anemizing applications were avoided as interfering with natural conditions. Before swabbing with the pollen extracts, a swab with simple diluting fluid was applied to see whether the nose was capable of nonspecific reaction. Not infrequently, the patient will react with sneezing to this control test, but other characteristics of an attack of hay fever, such as nasal obstruction and rhinorrhea, will be insignificant or absent. The observer will thus be aided in differentiating between the nonspecific and specific reaction. Careful observation of this reaction is important, in order for one to be able to make a quantitative allowance for it, when observing the specific reaction. After this control, a swab with a 10 units per cc. dilution was applied. If the hay fever attack did not occur, 100, and if necessary, 1000 units per cc. dilution was used.

The degree of reaction which can be thus elicited, naturally, depends on the strength of the solutions used and on the grade of sensitivity of the subject tested, as is the case with the dermal or intradermal tests. For simplicity in recording, the grade of sensitivity can be conveniently designated as A, B and C: A, being the grade if the patient responds with a typical attack of hay fever to a 10 units per cc. dilution; B, if to 100; and C, if to a 1000 units per cc. solution. If the reaction is elicited only with a 5000 units per cc. or stronger solution, the case is designated as doubtful or negative. Such cases are clinically insensitive, obviously, because the pollen concentration of the air rarely reaches the equivalent of these stronger solutions.

The reaction develops within a minute or two after applying the swab with the effective solution and lasts from five to 10 minutes. Profuse watery discharge, spasmodic sneezing and edema of the mucosa are the cardinal manifestations, and taken together, they furnish important indices which form the basis of comparison between the degree of sensitivity existing before and after treatment. Some experience is necessary before the observer can judge the intranasal picture with certainty. As a rule, the untested side may serve as a control since the reaction usually occurs on the tested side alone. Occasionally, however, the untested side is also involved in the reaction to some extent.

EVALUATION OF RESULTS.

With this method it was found that in each case the nasal mucous membrane was actually less sensitive after phenol

TABLE II.

Name	Before treatm.	2 weeks after	5 weeks after	8 weeks after	11weeks after	Nasal pathology
F. N.	B	Neg.	Neg.	C - D	C	
B. E.	B	C - D	C - D	B - C		Deviated septum.
M. G.	B	C - D		C - D	C - D	
D. R.	B - C	Neg.	Neg.	C - D	Neg.	Deviated septum.
C. K.	B	Neg.	Neg.	Neg.	C - D	Polypous degeneration
F. S.	B	Neg.	C - D			
A. W.	C	Neg.		C		
E. P.	C - D			Neg.	Neg.	
H. W.	C	Neg.	Neg.			
E. F.	B - C	Neg.	C	C		Chr. sinusitis, polyposis.
C. Z.	B	Neg.	Neg.	Neg.	C - D	
M. W.	B - C			Neg.		
S. F.	C			Neg.		
Ph. S.	B	Neg.	Neg.	Neg.	C -D	
G. P.	B - C		C	B		Irregular septum.
G. E.	B	C	B - C			Deviated septum.
Z. A.	A	C				

application than before. The dilution to which the above described reaction was obtained before treatment became ineffective and the reaction was elicited only when swab tests with stronger solutions were made.

Table 2 shows the state of reactivity of the nasal mucosa before and after treatment and also the results of periodic

testing. It presents only those cases, the records of which are fairly complete. It was very difficult to make these patients appear for periodic examinations once they were relieved. The *decrease* in sensitivity is clearly evident and can be considered a rule. As to the *degree* of this decrease, the table shows that the great majority of the cases were rendered clinically insensitive; however, a categorical statement should not be made on the basis of this relatively small group. Occasional borderline cases suggest the possibility of a less substantial decrease of sensitiveness, which may leave the patient clinically sensitive, though in a lesser degree. The *duration time* of the resulting relative insensitiveness is not sharply defined and by no means uniform. From this point of view considerable variation exists among the cases so that an exact estimation is not possible. A rough average, which may be helpful in a general way, can be readily inferred. Thus, in the great majority the intranasal swab test fails to show an increase in sensitivity before the fifth week after treatment. By the eighth week the increase is a more frequent phenomenon and its degree, in some cases, will be sufficient to render the patient clinically sensitive. As exceptions, shorter and much longer durations have also been observed. As to the latter extreme the records are not closed, as cases are still under observation.

No doubt, the return of the sensitivity is not purely spontaneous. It seems to depend greatly on such factors as would aggravate hay fever under any circumstances. It is even possible for such factors, provided they are sufficiently active, to cause a sufficiently early return of the sensitivity, to invalidate the treatment. Within this limited group nasal pathology, such as sinus infections, polyposis, deviated septa, etc., has been definitely proved to be such a factor (see Tables 1 and 2). Poorly administered treatment is obviously another. There are indications that a case of Grade A sensitivity will relapse faster into the clinically sensitive state than one of Grade B or Grade C. A more thorough discussion of these factors would exceed the limits of this paper. Suffice it to say that the importance of preliminary search for such factors in every case cannot be overestimated.

It follows from the transitory nature of this state of relative insensitiveness that this treatment should not be given

preseasonally, but preferably when the hay fever symptoms begin to present themselves. The part of the duration time of this insensitiveness which would elapse before the hay fever season began would be wasted and might be definitely missed towards the end of the season. At the same time the transitory nature of the mucosal change is also an assurance to those who fear the danger of a possible permanent damage to the nasal mucosa as result of this treatment. If clinical observations, as well as experiments, show that the mucosa is capable of a gradual relapse into the original state of hyperirritability and hyperfunction, it is, at least, very unlikely that eventually this tendency should be reversed purely as a result of phenol application. This assumption is also strongly supported by the fact that such an occurrence was not encountered in a group of patients numbering over 100, followed through a period of more than two years, in which many have had this treatment repeated at intervals.

SUMMARY.

The effect of intranasal phenol application has been studied in 28 consecutive cases of early and late hay fever. The technique is simple but must be precise. The treatment is not followed by stormy reaction or long convalescence. Ninety to 100 per cent relief was obtained in 75 per cent of the cases; 75 to 90 per cent relief in 8.3 per cent; 50 to 75 per cent relief in 12.5 per cent; and no relief in 4.2 per cent. By intranasal swab tests with serial dilutions of pollen extracts it was proved that this treatment produces an actual decrease in the sensitivity of the nasal mucosa to pollen. (The term *sensitivity* is not used in the allergic sense.) By periodic testing it has been found that this state of relative insensitiveness is not permanent. Its average duration observed in the group of cases here presented is approximately seven to eight weeks.

CONCLUSIONS.

Intranasal phenol application is an effective palliative treatment in hay fever. It is recommended as a valuable aid:

1. In cases of hay fever which present themselves for treatment during the season.

2. In cases where in past seasons the allergic treatment did not bring satisfactory results.

3. In cases where the patient does not tolerate well the hypodermic injections of pollen extracts, so that there is a constant fear of constitutional reactions.

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106 East 85th Street.

AMERICAN OTOLOGICAL SOCIETY.

Sixty-Ninth Annual Meeting, May 28 and 29, 1936.

The Sixty-Ninth Annual Meeting of the American Otological Society, Inc., convened at the Book-Cadillac Hotel, Detroit, Dr. Francis R. Packard, President of the Society, presiding.

Presidential Address. Dr. Francis R. Packard.

One of the most momentous meetings ever held by this Society was that which occurred under the presidency of Dr. Thomas J. Harris, at Montreal, in 1926. At that meeting the final steps were taken for the incorporation of the Society in order that it might be legally qualified to receive and expend funds for scientific research, and the Committee on Otosclerosis was able to announce that the Carnegie Foundation had granted to the Society a large sum of money to carry on its work, and that the movement was well under way to collect a large fund from other sources for the same purpose. At the same meeting, Dr. Harris in his most delightful presidential address gave a splendid summary of the history of otology in this country, and especially of the work of the American Otological Society.

In the following year — 1927 — Dr. Arthur B. Duel was President of the Society. Without disparagement to the labors of any of those who were engaged in this great work I think I can say with justice that we owe more to Dr. Duel than to any other individual for the success of the movement to make a scientific study of that most baffling problem — otosclerosis. In his presidential address in 1927 Dr. Duel outlined the activities of the Committee on Otosclerosis, leaving it to Dr. Norval H. Pierce, Dr. Eugene A. Crockett, Dr. J. Gordon Wilson and Dr. James F. McKernon to report on the various details of the work which had been their charge.

Although a formal tribute will be paid to the memory of Dr. Duel in the Transactions of the Society, I cannot refrain at this point from speaking of the great loss which we have sustained by his death on April 11. Since his election to membership in 1904, Dr. Duel was always a most active and useful member of the American Otological Society. Devoted to its concerns, no man ever took a more alert interest in forwarding them. During the years that have passed since 1927 Dr. Duel not only continued his deep interest in the work of the Committee on Otosclerosis, but, as you know, he also contributed greatly to scientific otology by his joint research with the late Sir Charles Ballance on the subject of facial palsy. Duel's charming personality added greatly to the joy of our meetings. In him we have lost a scientific leader and a dear friend.

Besides these two great leaders, Arthur Duel and Charles Ballance, our Society has suffered the loss of many others during the past year: Dr. Campbell Smyth, Dr. J. J. Thompson, Dr. Franklin C. Capron, Dr. Edward B. Dench, one of our oldest and best loved members, and Dr. Albert Gray, of London. In honor of these, our deceased Fellows, I am going to ask the members of the Society to stand for a few moments in silent remembrance.

These two meetings of 1926 and 1927 mark an epoch in the history of our Society. Thenceforth the tendency has been more and more towards giving up our meetings to papers and discussions on the scientific aspects of otology. Although there has been some adverse criticism of this policy it seems to me that the advantages derived from such presentations are of incalculable benefit,

not only to those who attend our meetings but to the science of otology. There are but few of us who are engaged in clinical work who have either the necessary time or ability to study the fundamental problems which underlie the science of otology. Our meetings in recent years have not only afforded a medium by which those who are engaged in research in the physics, physiology and pathology of the organ of hearing can present and discuss their work, but I think have been of untold value to those of us who would otherwise be ignorant of the scientific foundations upon which we must depend if our practice is to be anything but empirical. In other words, we are placing otology in its rightful position as a science, instead of an art.

With deep appreciation of the honor you have conferred upon me in electing me to serve as your President at the Sixty-Ninth Annual Meeting of our Society, we will now proceed with the scientific business of our meeting.

Symposium on Bone Conduction: Report of the Committee on Methods of Testing the Hearing by Bone Conduction. Dr. Stacy R. Guild.

DR. STACY R. GUILD, as Chairman of the Committee, presented the report by reading only the summary. With the consent of the Society, reading of the complete report was omitted, since, in mimeographed form, it had been mailed to all members of the Society in advance of the meeting.

Report of the Committee on Methods of Testing the Hearing by Bone Conduction. Dr. Stacy R. Guild.

The general form of the Committee's report has been determined by the fact that it is presented as a part of the Symposium on Hearing by Bone Conduction. Theories, new observations and the interpretation of data fall into the province of the contributions by individual investigators. The Committee has attempted to present, in a more or less logical sequence, statements of the basic facts about conditions which affect the accuracy of clinical tests of hearing by bone conduction and the understanding of publications on the subject.

For the most part, the facts presented in the report are not new; and many otologists know of the errors caused by failure to recognize these facts. Nevertheless, they neglect to observe the precautions that they know are indicated by the facts. The usual explanation offered is something like this: "I realize that my tests probably are not exact and that my findings may not mean much to others, but I have learned by experience how to interpret the tests I make with my own instruments under the conditions that I use them. Therefore, I hate to change my methods."

While this attitude may possibly be satisfactory for the individual otologist and his immediate work, there is no doubt that it is far from satisfactory from the point of view of the advancement of our knowledge of hearing by bone conduction. From the latter point of view, viz., that of advancing knowledge, it is highly desirable that all otologists make their examinations by methods such that their reports, when assembled, can be collectively utilized in the study of the problems of impaired hearing.

It is hoped that the research papers on our program today will arouse an active interest on the part of many otologists in the problems of hearing by bone conduction and that the work of these otologists will be aided by the outline of the status quo contained in this report. The Committee believes that the methods suggested in the report for the avoidance of errors in testing hearing by bone conduction are practicable for adoption by otologists generally, and that the observance of the precautions recommended should increase the value of clinical tests of hearing.

(To be continued in a succeeding issue.)